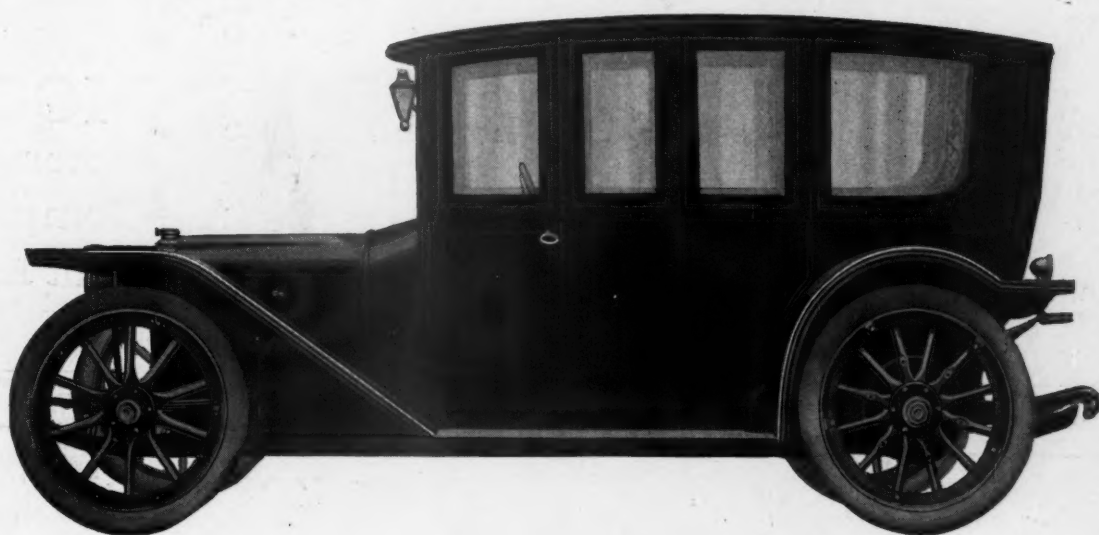


MOTOR AGE

VOLUME XXII

CHICAGO, DECEMBER 19, 1912

NUMBER 25



*Electrically
Started*

AMERICAN UNDERSLUNG

*Electrically
Lighted*

A Convertible Limousine—Coupe

¶ The "American Tourist Limousine" is rapidly being adopted as a family closed car. A chauffeur may be dispensed with merely by dropping the glass partition at the back of the driver's seat. This unusual convenience means much to the prospective buyer of a closed car who does not wish to incur the expense of chauffeur hire.

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¶ The convertible limousine-coupe seats five with comfort—a fifth auxiliary seat fits into the upholstery. The interior is handsomely finished in the most expensive imported gray whipcord. The car is priced at \$3500—complete.

¶ We will be glad to forward an artistically prepared booklet on closed cars.

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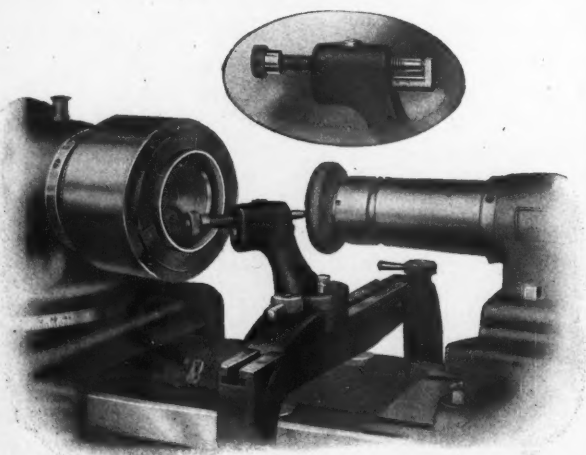
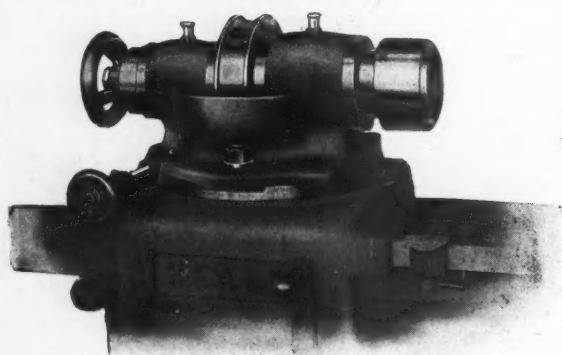
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MOTOR AGE

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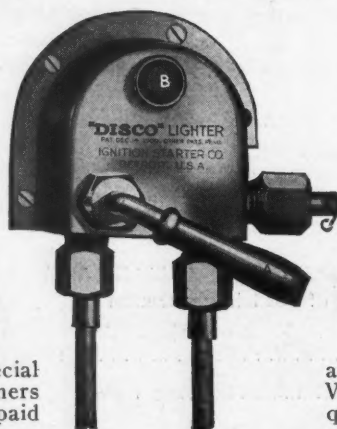
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MOTOR AGE

Paris Salon Show Market of Europe

French Declare They Have Largest Exhibition of Motor Vehicles Ever Got Together Under One Roof—America Directly Represented by Twenty Makes—More Than 200 Concerns Crowded Out and Forced to Take Another Building

PARIS, Dec. 7—President Fallières, attended by half a dozen ministers and all the local dignitaries, presided at the official opening today of the thirteenth Paris salon, organized in the Grand Palais by the five leading trade associations. **Greatest of Exhibitions**

This is the largest exhibition of motor vehicles ever got together under a single roof, the total number of stands being 565, compared with 353 at the London show, and the total area of floor space occupied by these stands 260,000 square

By W. F. Bradley

feet. This constitutes a record in the history of European motor shows.

Although comprising a considerably greater area than the London show, and having a much larger number of exhibitions, the Paris event is less international than the one in England. The vast majority of the exhibitors are French, the foreign list being headed by Great Britain with thirty-four exhibitors, of which eight are car manufacturers and the remainder

accessory, tire or body manufacturers. America is directly represented by twenty firms, in addition to accessory manufacturers whose goods are shown on the stands of various French agents.

American Representation

The American representation is a remarkable increase, compared with the last show, held 2 years ago, when only a couple of firms from across the Atlantic had their goods on view. It shows that the American firms are securing a footing on the French market, probably the most diffi-



GENERAL VIEW OF PARIS SALON, OPENED TO PUBLIC DECEMBER 7

cult and the most critical in Europe. As all the firms have drawn good positions, four of them being placed around the main entrance, they cannot fail to attract a considerable amount of attention.

America's Representation

The American cars represented in the big hall are: Detroit electric, Buick, Century, Case, Flanders, Ford, Hupmobile, Mitchell, Oakland, Overland, R. C. H. and Reo. Other American firms having their own stands are Abbott & Co., with Rushmore lamps; Bowser, B. F. Goodrich Tire Co., Klaxon Horn Co., Oildag Co., T. Pilter, of Toledo; Potter & Johnston, and Vacuum Oil Co.

Germany shows twelve makes of cars, Italy and Belgium each have nine and Switzerland is represented by six car and body manufacturers. Altogether there are ninety foreign and 565 home firms in the Grand Palais, this being a higher proportion of foreigners than on any previous occasion. In making this count only firms having a separate stand have been considered. There are a number of foreign manufacturers in the accessory business whose goods are handled by French houses; these have been counted in with the French firms.

Big as it is—for there doubtless is no other hall in Europe offering a floor space of 260,000 square feet, the Grand Palais has proved too small for its needs. As far back as July every inch of space had been rented. The 200 firms having been crowded out appealed to the organizing committee to open an overflow section, but this request was not acceded to. Consequently an independent organization undertook to get together an overflow section and for this purpose secured the Jardin de Paris, one of the amusement centers in the Champs-Elysees, usually only open during the summer months.

This section will be opened on December 14, or a week later than the main show, and will keep open until the new year. On the opposite side of the river, within a stone's throw of the Grand Palais, there is a third exhibition, devoted entirely to second-hand cars and accessories.

Non-Poppet Valve Motor Situation

THE outstanding feature of the non-poppet valve situation is the increase in the number of continental firms having adopted the Knight motor. Panhard & Levassor, holding manufacturing rights for France, is now building but two models with the poppet-valve motor, these being small types of 2.7 and 5.5 inches bore and stroke and 3.1 by 4.3 inches bore and stroke. All the other models have the Knight sleeve-valve motor.

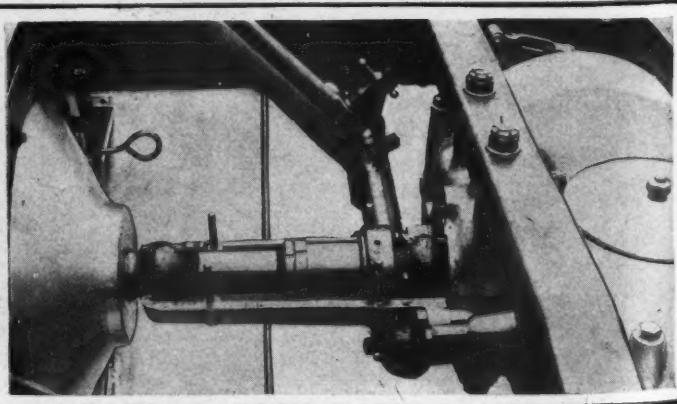
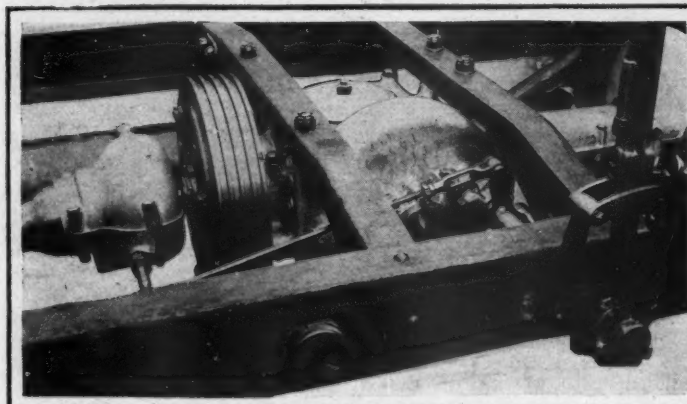
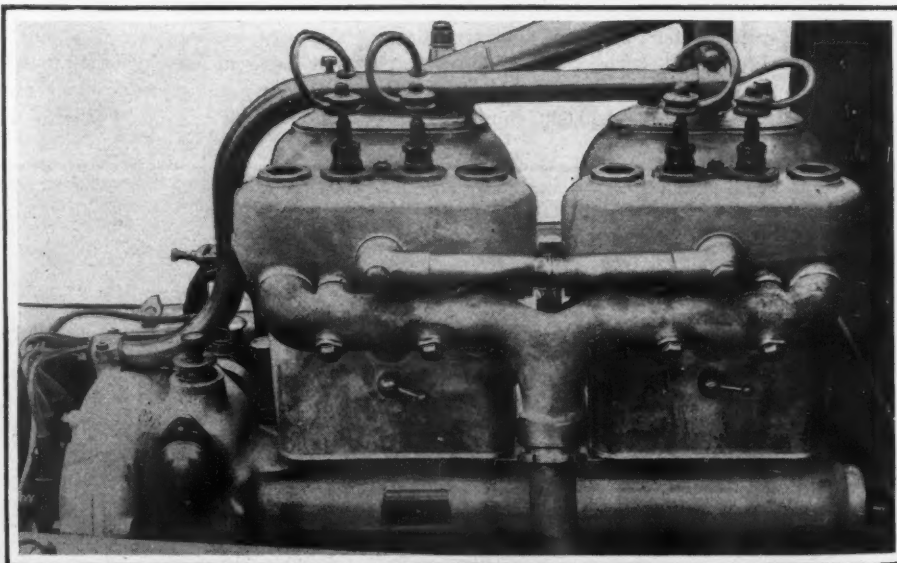
French Take Out Licenses

Mors, Gregoire, Aries, Rossel and Clement-Bayard have secured licenses for the sale of the Knight motor and are fitting it to some of their chassis for the coming season. Mors has made arrangements for bringing out four Knight motors, the respective bore and stroke being 2.9 by 4.7, 3.5 by 5.1, 3.9 by 5.5, and 4.8 by 5.9 inches. These are in addition to four poppet-valve models, making eight models in all, but as the chassis dimensions are the same for a Knight and a poppet-valve type, it is practically a case of four chassis with four alternate types of motors. It is worth noting that the 2.9 by 4.7-inch motor is

the smallest Knight type sold in France, most of the firms making their small motors with poppet valves and only the larger and more expensive types with the Knight motor. The Mors power plants are supplied by the Minerva factory in Belgium.

Gregoire has at present only one model of the Knight on the market, this being a four-cylinder of 3.1 by 5.1 inches bore and stroke fitted in a chassis having worm-driven rear axle. It is intended, however, to produce a larger type at an early date, and in all probability the proportion of Gregoire-Knights will be about one-quarter of the total output. In this case the Knight power plants are imported from the Daimler factory at Coventry. Clement-Bayard is building two Knight types for 1913, of respectively, 3.5 by 5.1 and 3.9 by 5.5 inches bore and stroke. Four other models, of smaller size, are made with poppet valves. Rossel and Aries have made arrangements to equip some of their cars with the Knight motor, but particulars have not yet been given out.

The entire Minerva output now consists of Knight motors, this Belgian firm



FEATURES OF SMALL RENAULT FOR 1913

Top view shows motor of 11-horsepower Renault. Lower left hand corner, new internal footbrake and gearbox. Lower right hand corner, inclosed shaft between clutch and gearbox.

Continental Firms Take Up the Knight

under its own name and building a number of power plants for other continental firms. Extensions giving 100 per cent increased capacity and floor space have just been completed. The only other Belgium firm equipping its cars with the Knight motor are Germain. In Germany the rights are held by Mercedes and licenses have been secured by N. A. G., and the Kraftfahrzeug Aktien-Gesellschaft. In Austria Johann Puch has the rights and in Switzerland Knight motors are being marketed by Martini and the Sigma company.

Other Non-Poppets

Non-poppet valve systems other than the Knight are being taken up very slowly. More than one case could be mentioned of French firms having purchased non-poppet valve patents, and tested them out only to abandon them. It must be admitted that the introduction to the European market of any rival of the poppet valve has now become a most difficult matter. Peugeot is now cataloguing a non-poppet valve type, but has not placed it on exhibition. Delahaye admits having a non-poppet valve model in preparation, but is not fixed as to

the date of its public appearance. Those actually producing non-poppet valve motors are Darraeq, with the Henriod rotary distributor model; Rolland-Pilain, with a single sleeve type; Piccard-Pictet, with a license for the Argyll motor; Itala, with a rotary distributor; Schneider, with a ring type applied to one model only; C. I. D., with a rotating ring type, and C. L. C., with a rotary sleeve model.

The C. L. C., with a single rotary sleeve, has been produced for more than a year as a single-cylinder model, and is now being built in a four-cylinder of 2.5 by 5.1 inches bore and stroke. The sleeve has a single opening and carries a very deep compression ring, having an opening corresponding with that in the sleeve. It is prevented from rotating on the sleeve by means of a stud. There are two ports for respectively intake and exhaust, the width of construction. By reason of these bearings at the base of the sleeves the overall length of the motor is increased, this explaining the single casting of the cylinders. Because of the length of the motor, five bearings are used for the crankshaft,

sleeve. Each sleeve has near its base a skew gear by which it receives its motion from a half-time shaft.

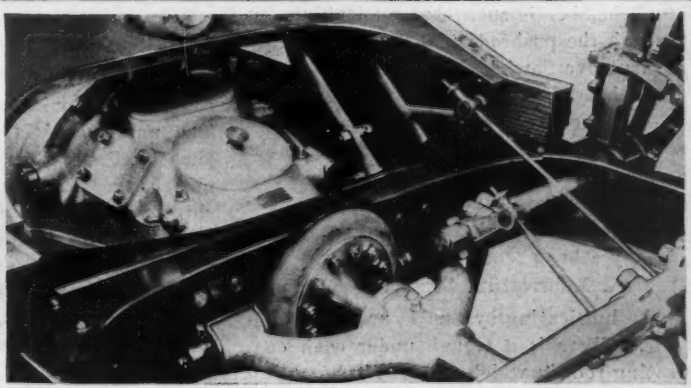
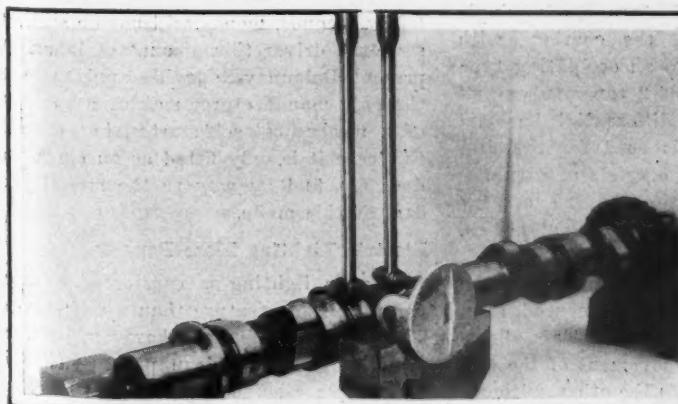
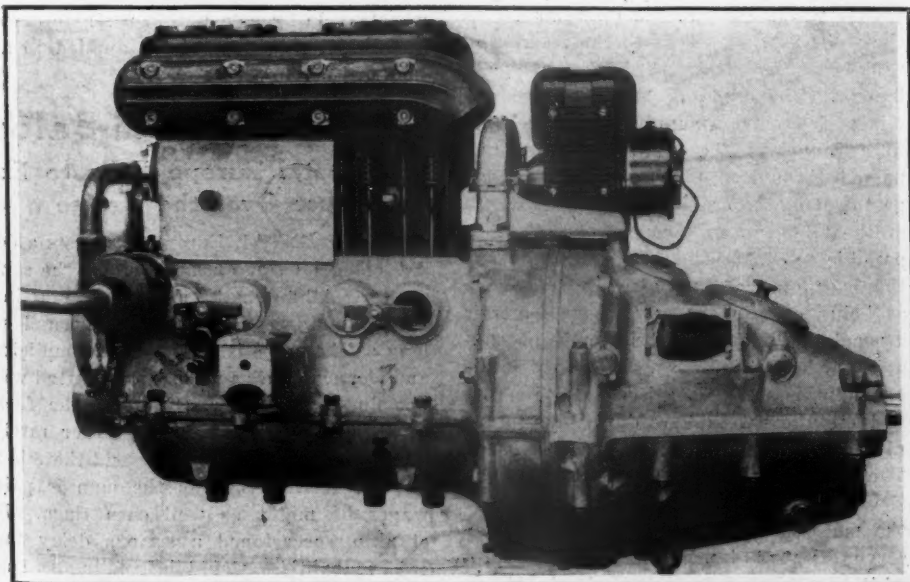
Increasing Overall Length

Above and below this gear is a radial and thrust bearing. This double-bearing adds to the cost, but it simplifies the assembly compared with previous methods of these ports being very much greater than the width of the openings in the sleeve; thus there is a certain period during which the opening remains constant, despite the continuous rotation of the this being quite unusual for a motor of such small bore. It has been decided, however, to fit only three bearings for the standard models. The half-time shaft occupies the position usually given to the camshaft, but instead of being within the crankcase it is mounted on radial ball and thrust bearings within an independent housing bolted to the crankchamber.

Varying the Timing

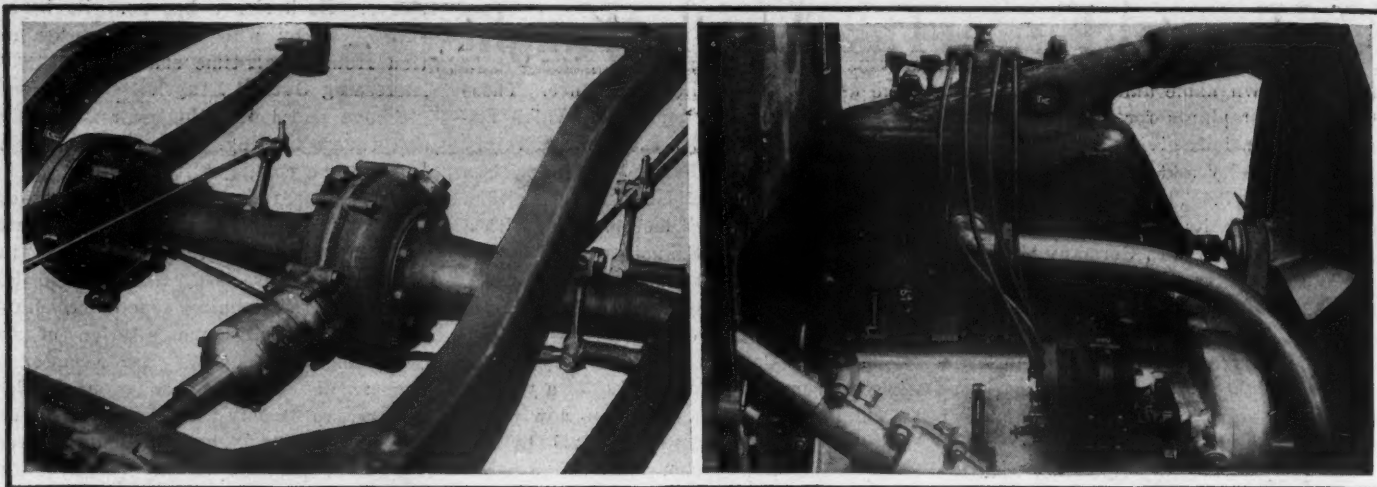
As there is silent chain-drive from the crank to the secondary shaft, it is only necessary to take off the nuts on the holding down studs, place the oldham coupling horizontal and withdraw the entire shaft with its bearings. By this arrangement, it is possible to vary the timing of the sleeves with comparatively little difficulty. On one end of the sleeve-driving shaft is a bevel pinion driving the high-tension magneto, which fires through plugs placed directly in the detachable heads of the cylinders. Instead of the water inlet being at the base of the cylinders, it is cast with the crankcase, there being a short, inclined length of piping from the base of each cylinder and cast with it, to this inlet water pipe. Lubrication is by means of a mechanically operated drip feed from a dashboard tank, there being a separate lead to each of the cylinders at the height of the ring, and a fifth feed for the crankcase, where there are separate troughs for the connecting rods, each rod being fitted with a dipper. It is claimed that this small motor has developed 18 horsepower on the bench tests.

The C. I. D. non-poppet valve motor has remained practically unchanged since its first appearance.



PANHARD OFFERINGS FOR NEXT SEASON

Top view shows Panhard unit power plant on 70 by 140-millimeter four-cylinder. Lower left hand corner, camshaft and valve tappets used without guides. Lower right hand corner, rubber coupling between primary and propeller shafts



SIZAIRE-NAUDIN'S REAR AXLE WITH BRAKE ADJUSTMENTS AND NEW BALLOT MOTOR USED BY SIZAIRE-NAUDIN

Panhard Ideas for 1913

Small 10-Horsepower Four Departure from Usual Practice

PANHARD has made some important departures from his usual practice in the small 10-horsepower, four-cylinder of 2.7 by 5.5 inches bore and stroke, which model replaces a twin-cylinder chassis of 3.1 by 4.7 inches bore and stroke. Unit construction is adopted, but this is not altogether new, for one of the larger Panhard models was so built a year ago. The cylinders are a block casting with a three-bearing crankshaft. Pump water circulation is employed. When these small series were first produced thermo-syphon flow was adopted, but it was quickly dropped in favor of forced water circulation, and all Panhard models now carry a water pump. The valve-operating mechanism is somewhat unusual. Valves are all on one side, with a large diameter plug over each pair; the camshaft with integral cams is driven by a silent chain and a transverse shaft drives the magneto and water pump.

The pushrods are not fitted with the usual type of guides; they are long steel rods with hollowed heads receiving the end of the valve stems and are maintained at their base in the hollow portion of an intermediate arm between the cam and the pushrod. The shape of the top of the crankchamber is such that oil leaking out through the pushrods will drip back again without overflowing down the sides of the crankchamber. Each pair of intermediate arms between cam and tappet is secured in a circular plate on side of crankchamber and held on their seat by a dog. Thus, when the valves have been taken out, the tappets can be withdrawn without touching any other part.

Panhard Lubricating System

The lubricating system is new in its details. There is a trough under each connecting rod, in which the oil level is maintained just high enough for running light. On the wall of each compartment of the crankchamber is an inclined, open oil lead cast with the chamber, and serving to lead

the oil splashed up in one chamber to the adjoining chamber. The oil thus passes from the rearmost or fourth cylinder to the third, then to the second and finally to the first. Naturally the inclination of the oil leads on the wall of the crankchamber is such as not to interfere with the flow when the car is on a gradient. In the portion of the crankchamber corresponding to the first cylinder, the oil lead is replaced by a pocket which gathers the oil splashed on the walls and returns it to the reserve oil tank cast in the right-hand crankcase hanger. The used oil, however, does not mix with the fresh supply, but is received in a funnel in the tank, is filtered and passed through a pipe to the rear compartment of the crankchamber. By means of the filler cap on the reserve tank, it is possible to verify the flow of the oil. In the base of the tank already mentioned as being cast in the crankcase hanger is a needle valve connected up to the accelerator pedal. Thus, as the throttle is opened this valve is raised from its seat and oil allowed to flow down the return pipe to the trough for the fourth cylinder. The connection between the throttle and the oil feed is on the carburetor side of the motor, with the filler cap for the reserve oil tank immediately to the right of it.

Panhard Using Universal Joint

An entirely new feature is the single joint at the rear of the gearbox, with final drive by shaft to an oscillating type of rear axle formed of 2 taper tubes and a central aluminum differential housing. The universal joint is used for the first time by Panhard and consists of a rubber and canvas construction having a very close resemblance to a pneumatic tire, having one of its heels secured to a disk mounted on the secondary shaft of the gearset and the other heel secured to a plate on the propeller shaft. This allows a certain freedom of movement of the two shafts in relation one to the other, without, however, preventing the second being driven by the first. This joint is known by the Panhard engineers as a flector and is built up of canvas and rubber in prac-

tically the same way as a tire; the canvas, however, is laid in the opposite way to that of a tire in order to provide for the driving effort.

In order that the flector may retain its circular form a band of steel is placed inside it and the two shafts are centered by a hard wood block, so that the flector has not to carry the weight of the shaft. On this model both brakes are on the rear wheels, side by side within a single drum. This is a construction now applied to all Panhard models.

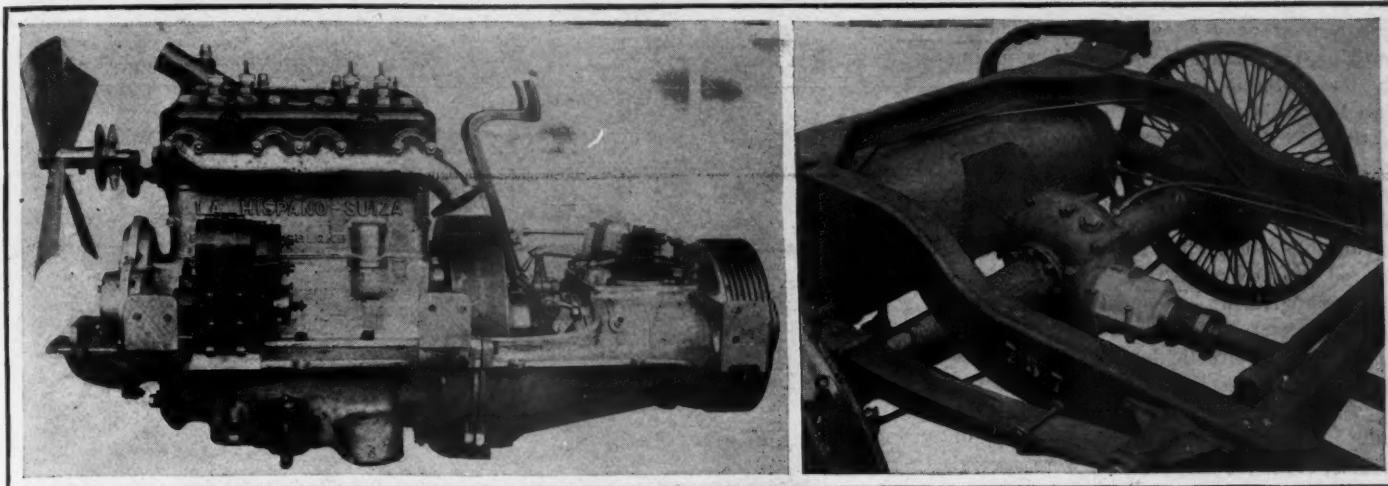
Self-Starters in Salon

Continental Europe Fails to Enthuse Over the Device

CONTINENTAL Europe manifests a decided lack of enthusiasm for the self-starter. All automatic methods of starting up the motor complicate the car, and so long as the craze is for extreme simplicity and clean-cut lines a mechanical starter will not find much favor. There is the fact, too, that the European car owner rarely goes out without a mechanic and there is a natural feeling that as the man is paid wages he might as well earn them. If cranking occasioned a serious delay the owner doubtless would be willing to put down the extra money to save time; but so long as it calls for an effort during but a few seconds, money will not be spent to save the driver this amount of labor. At present Delaunay-Belleville appears to be the only manufacturer making a specialty of a mechanical self-starter, but even in this case it is only fitted as an extra and does not find its way to the majority of cars of this make.

Electric Lighting More Popular

Electric lighting is considered a much more desirable feature than a self starter. There is this difference, however, between European and American practice that in the former case the lighting outfit is generally an added accessory for which provision has been made in the original design of the chassis. This is explained by the fact that in Europe only the cheaper



HISPANO UNIT CONSTRUCTION WITH RIGID MOUNTING AND REAR AXLE, WITH UNIVERSAL JOINT AND FLEXIBLE OIL LEAD

and medium-priced cars are sold all complete for the road, and in order to keep prices low these cars are fitted with ordinary oil lamps. The higher grade cars, which, when completed, always have electric lights, are sold by the manufacturer as a chassis and have their bodies made to order by a coachbuilder. Panhard, for instance now specializes on a couple of series of completely equipped cars, and on one of these chassis there is a platform for an electric lighting dynamo and a pinion for driving it by silent chain. When catalogued, however, the car is given with oil lamps.

Still Make Many Models

Renault and Others Continue to Follow Old Practice

SO far as France is concerned, the average number of models per firm has not shown any decrease. The old idea was that each firm should have a sufficient range of models to satisfy every client from the poorest to the richest. Renault is a conspicuous example, with cars varying from two small-cylinder to six big ones. A certain number of firms having attempted to follow this example have not failed to discover its disadvantages, and with a view to cutting down overhead charges, have abolished the models for which there was the least demand.

The matter has been given a lot of attention by French manufacturers and some unsuccessful attempts have been made to mutually agree on what types of cars should be produced by each firm. This ambitious scheme having failed to materialize, a certain number of manufacturers have reduced their number of models, while others are continuing the full range with special attention to one particular type. Delage has cut his models down to three—a couple of fours and a six; Chenard & Walcker has got the number down to four, of which three are fours and one a six; Darracq has abolished some of the larger models, now specializing on three four-cylinder types; de Dion-

Bouton has cut out all single-cylinder models, one of the twins, and while having a big series, is specializing on a small four and a small eight. This firm, by the bye, is the only one paying attention to eight-cylinder motors.

Panhard Specializing

Panhard is more interested in the high-class trade, but is now specializing on one poppet and one non-poppet valve type sold fully equipped for the road. Renault, after an extensive tour through America, has come back with the intention of building one of his models, rated at 11-horsepower and having a bore and stroke of 75 by 120, on American lines, and is putting it on the market next year fully equipped for the road.

In contradistinction to these firms having either cut down to their number of models or specialized on one or two, there are certain firms having increased their types. This is largely owing to the fact that they have adopted non-poppet valve motors without abandoning any of their poppet-valve types. This is the case with Gregoire, having replaced a twin by a small four, put on an additional Knight motor and made preparations for a larger Knight to go on the market during the year. Mors has taken up the Knight with the same results, there now being four non-poppet valve models and four chassis of similar design equipped with the sleeve-valve motor. Peugeot, instead of decreasing has increased the number of models by reason of a desire to use worm drive on two new types.

European Body Styles

Aim Is to Get Unbroken Lines and Not Sacrifice Comfort or Space

BODYWORK is a feature of more than ordinary excellence. With plenty of space available, it has been possible to give all the body makers important stands, and in addition the car manufacturers each show one or two distinctive types of bodies, side by side with their chassis; this makes it possible for the Paris salon to

be the largest display of body work in the world. Whatever the type, whether it be a little runabout or a heavy limousine, the main desire is to get unbroken lines so as to offer a perfectly boat-shaped, stream-line body.

All added accessories are being eliminated as far as possible; levers are brought inside the body, lamps are inserted in the scuttle dash or are merged into the front mudguards, the horn is made as inconspicuous as possible, tool boxes form a part of the running boards, and not a projection on them, and in no case is there a break at the dashboard, the line being unbroken from the radiator to the rounded off rear panel. A couple of seasons ago the stream-line designs were in the hands of speed maniacs, who were willing to make great sacrifices of comfort and space in order to have clean, unbroken lines. There has been progress since then, and while every effort is being made to get unbroken lines, comfort, accessibility and luggage-carrying capacity is not being sacrificed unnecessarily.

Abolishing Top Straps

With neat appearance in view, it is becoming common to abolish the use of straps from the hood to the front mudguard or the mudguard stays. Instead, there is a ball head on the top of the windscreen uprights, these receiving a socket on the front bow of the hood, the two being locked together by a winged nut. It is just as effective as straps and considerably neater. On two-seaters there is the advantage that tops can be put up by this method without getting out of the car.

There is a strong tendency, particularly on touring cars, to enamel all the metal work in the color scheme of the car, instead of having it polished. In some cases this has been extended to the lamps, but this is not general.

In a few cases an attempt has been made to avoid the abrupt break of the windscreen, in order to harmonize with the stream lines of the body. On an open car this is really a difficult matter without making the screen a fixture. On a Martini

car a very good effect was obtained by making the screen V-shaped, thus giving better protection to the occupants, offering less resistance.

On a D. S. P. L. there was a very neat arrangement of a circular locker at the rear of the car, the diameter of which was slightly less than that of the demountable rim. Thus two rims could be placed on the projecting locker, and as this compartment had a bulging door, the general effect was that of an egg-shaped torpedo. The circular locker in itself gave considerable space, but this was further increased by extending the storage space under the rear seats, with admission, of course, from the rear. There were several cases in which a large luggage compartment or tire compartment was built in the rear panel, this panel being hinged to give admission.

Two Extremes in Favor

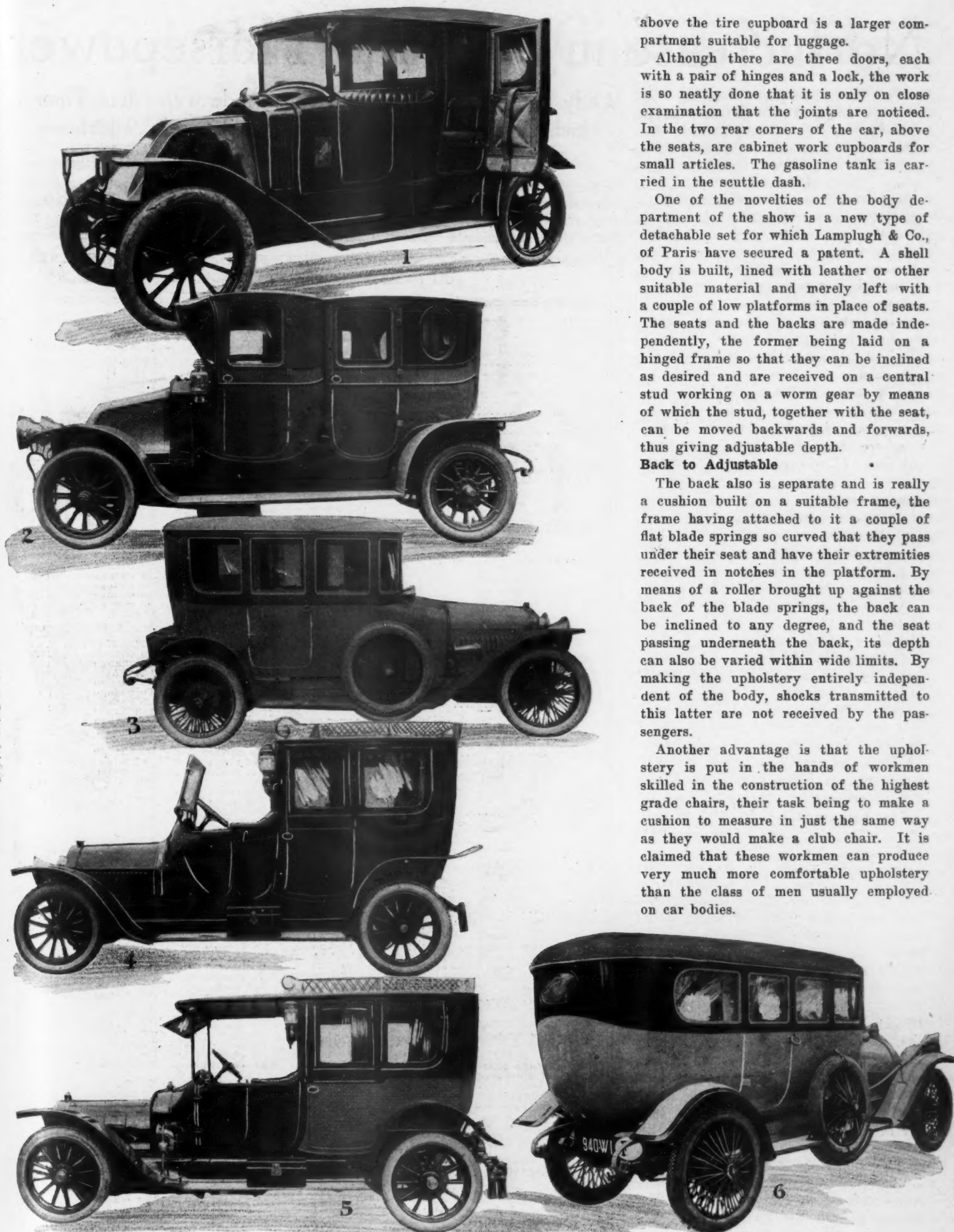
The two extremes of cars—open, full touring models, or closed berlines or saloon cars—are in favor in France at the present time. All-weather types find comparatively little favor. The stream line D-fronted berline is a very strong feature. It is nearly always made with a dome roof, the sides rounded off into the back and the front, no dashboard, and generally two entrances on the left-hand side and one on the right-hand side.

Alin & Liautard have made a specialty of this type of body and have some very attractive models on view. One of the most interesting is what is known as the egg body built on a Gregoire chassis. It is a saloon car with rounded roof, surmounted with a second roof, as on trolley cars, but with all the angles rounded off. The front of the body is D-shaped, being all glass, and the whole of the roof is of glass. The rear of the body is egg-shaped, but all the space at this portion of the car has been made use of for luggage and spares. Through a door at the rear fitted with hidden hinges a detachable wire wheel can be pushed into a special compartment under the rear seats. Below this is a locker of sufficient size for all the tools and spares necessary on a car, and



BODY TYPES SEEN IN PARIS SALON

1—Sautter-Harls two-seated torpedo. 2—Sporting three-seater on Gregoire chassis. 3—English Daimler with French touring car body and sliding side curtains. 4—Double phaeton torpedo on Hotchkiss chassis. 5—Vinot runabout with folding rear seat. 6—Hispano-Suiza runabout



CONTINENTAL CLOSED BODIES

1—Charron limousine. 2—Double-bodied berline on a Renault chassis. 3—Hispano-Suiza berline with dome-shaped roof. 4—Industrielle body on Vinot chassis. 5—Delaunay-Belleville chassis with Girardot limousine body. 6—Stream-line berline brought out by Alin-Liantard

above the tire cupboard is a larger compartment suitable for luggage.

Although there are three doors, each with a pair of hinges and a lock, the work is so neatly done that it is only on close examination that the joints are noticed. In the two rear corners of the car, above the seats, are cabinet work cupboards for small articles. The gasoline tank is carried in the scuttle dash.

One of the novelties of the body department of the show is a new type of detachable set for which Lamplugh & Co., of Paris have secured a patent. A shell body is built, lined with leather or other suitable material and merely left with a couple of low platforms in place of seats. The seats and the backs are made independently, the former being laid on a hinged frame so that they can be inclined as desired and are received on a central stud working on a worm gear by means of which the stud, together with the seat, can be moved backwards and forwards, thus giving adjustable depth.

Back to Adjustable

The back also is separate and is really a cushion built on a suitable frame, the frame having attached to it a couple of flat blade springs so curved that they pass under their seat and have their extremities received in notches in the platform. By means of a roller brought up against the back of the blade springs, the back can be inclined to any degree, and the seat passing underneath the back, its depth can also be varied within wide limits. By making the upholstery entirely independent of the body, shocks transmitted to this latter are not received by the passengers.

Another advantage is that the upholstery is put in the hands of workmen skilled in the construction of the highest grade chairs, their task being to make a cushion to measure in just the same way as they would make a club chair. It is claimed that these workmen can produce very much more comfortable upholstery than the class of men usually employed on car bodies.

No Increase in Average Horsepower

LIKE its London predecessor, the Paris show is one of only moderate changes and practically no startling designs. Statistics would show that the average horsepower has not shown any increase, but this is the fault of the statistics. The official European formula for calculating horsepower practically ignores stroke, and as piston strokes have been steadily increased, horsepower has gone up a little with the larger cylinder capacity. This, of course, is not brought out in the statistics; as examples of the errors into which the uninitiated may be led by the method of calculating horsepower, may be mentioned the Sizaire & Naudin, 70 by 170, which is officially of lower horsepower than the same firms 75 by 120 model; also the Hispano-Suiza's 80 by 180, which has the same rating as the firm's 80 by 110.

The average horsepower stands at 16, European rating, which is slightly in excess of that of 2 years ago. The average cylinder bore, considering four-cylinder models only, is about 80 millimeters, or 3.1 inches. Only a very small number of cars are being made with more than 4-inch cylinder bore, while a very big proportion of the French models are built with motors of 70 and 75 millimeters—2.7 and 2.9 inches.

Typical French Motors

About 50 per cent of the French makers limit the size of their motors to 80 millimeters, while, where larger types are built, they generally comprise a small proportion of the firm's total output. Delaunay-Belleville, Hotchkiss, Mercedes, Metallurgique, Lancia, Itala, Unic, Leon Bollee, Metallurgique and Minerva are the leading firms which produce a majority of their cars with motors of more than 3.1 inches bore.

The longest stroke on the practically commercial models is 180 millimeters, or 7.08 inches, on one of the Hispano-Suiza cars, the cylinder bore of which is 3.1 inches; Pipe has also 180 millimeters stroke for a bore of 100 millimeters; Sizaire & Naudin is second with 170 millimeters, or 6.69 inches, stroke for a bore of 2.7 inches. Other long strokes are Gregoire, with 80 by 160, La Buire 80 by 160, Chenard & Walcker 80 by 150, Renault 100 by 160, Brasier 100 by 150, and, most significant, Panhard with 70 by 140. There is no case in which the stroke has been reduced, but a considerable number in which it has been increased a little. Delage, for instance, has changed his four-cylinder from 75 by 120 to 75 by 130 millimeters, and his six-cylinder from 66 by 120 to 65 by 130; Piccard-Pictet has changed from 90 by 130 to 90 by 150 and 90 by 170; Bozier and Alcyon have each changed from 75 by 120 to 75 by 130. Finally, Ballot, one of the largest motor makers for the trade, has added 10 milli-

Only Few Continental Cars Being Made with More Than 4-inch Bore, While Most Motors Are 2.7 and 2.9 Inches—
Longest Stroke, 7.08, on a Hispano-Suiza Model

meters to the stroke of nearly all his motors.

For motors of 65, 70 and 70 millimeters

bore it is the common practice to fit two-bearing crankshafts, the crankchamber then having no horizontal division. This

COMPARISON OF LEADING CONTINENTAL FOUR AND SIX-CYLINDER CARS
AT PARIS SALON FOR 1912 AND 1913

| | 1912 | | 1913 | | H. P. English R. A. C. Rating. |
|--------------------------|---------------------------------|-----------|---------------------------------|-----------|---|
| | Bore and Stroke Millimeters. | Inches. | Bore and Stroke Millimeters. | Inches. | |
| Adler | 75x103 | 2.95x4.05 | 75x120 | 2.95x4.72 | 13.9 |
| | 85x115 | 3.34x4.52 | 80x130 | 3.14x5.11 | 15.8 |
| | 90x125 | 3.54x4.92 | 92x148 | 3.62x5.82 | 21.0 |
| | 105x140 | 4.13x5.51 | 114x160 | 4.48x6.29 | 32.0 |
| | 115x140 | 4.52x5.51 | 125x160 | 4.92x6.29 | 38.8 |
| Alcyon | 75x120 | 2.95x4.72 | 75x130 | 2.95x5.11 | 13.9 |
| | 80x130 | 3.14x5.11 | No change | No change | 15.8 |
| Aries | 60x100 | 2.36x3.93 | No change | No change | 10.1 |
| | 65x100 | 2.55x3.93 | No change | No change | 10.5 |
| | 75x140 | 2.95x5.51 | No change | No change | 13.9 |
| | 84x130 | 3.30x5.11 | No change | No change | 17.5 |
| | 105x160 | 4.13x6.29 | No change | No change | 27.3 |
| Austro-Daimler | 80x110 | 3.14x4.33 | No change | No change | 15.8 |
|  | ..... | ..... | 90x140 | 3.54x5.51 | 20.1 |
| | 105x130 | 4.13x5.11 | No change | No change | 27.3 |
| | 120x157 | 4.72x6.18 | 120x154 | 4.72x6.06 | 35.7 |
| | 105x165 | 4.13x6.49 | No change | No change | 27.3 |
| Barre | 65x110 | 2.55x4.33 | 65x110 | 2.55x4.33 | 10.5 |
| | 75x120 | 2.95x4.72 | Not made | Not made | ..... |
| | 75x130 | 2.95x5.11 | No change | No change | 13.9 |
| Bazelaire | 75x100 | 2.95x3.93 | No change | No change | 14.3 |
| | 76x120 | 2.99x4.72 | No change | No change | 17.5 |
| | 84x130 | 3.30x5.11 | No change | No change | 12.8 |
| Benz | 72x120 | 2.83x4.72 | No change | No change | 15.8 |
| | 80x130 | 3.14x5.11 | No change | No change | 20.1 |
| | 90x140 | 3.54x5.51 | No change | No change | 22.4 |
| | 125x150 | 4.92x5.90 | No change | No change | 38.8 |
|  | ..... | ..... | 95x140 | 3.74x5.51 | 42.0 |
| Berliet | 70x100 | 2.75x3.93 | 130x160 | 5.11x6.29 | 84.5 |
| | 80x120 | 3.14x4.72 | 185x200 | 7.28x7.87 | 12.1 |
| | 100x140 | 3.93x5.51 | No change | No change | 15.8 |
| | 120x140 | 4.72x5.51 | No change | No change | 20.1 |
| Blanchi | 90x115 | 3.54x4.52 | 90x140 | 3.54x5.51 | 24.8 |
| | 110x150 | 4.33x5.90 | No change | No change | 35.7 |
|  | ..... | ..... | 100x140 | 3.93x5.51 | 20.1 |
|  | ..... | ..... | No change | No change | 24.8 |
| Bollee, Leon | 83x110 | 3.26x4.33 | 130x160 | 5.11x6.29 | 30.0 |
| | 95x130 | 3.74x5.11 | 130x150 | 5.11x5.90 | 42.0 |
| | 98x130 | 3.85x5.11 | No change | No change | 16.9 |
| | 106x130 | 4.17x5.11 | Not made | Not made | ..... |
| | 125x150 | 4.92x5.90 | Not made | Not made | ..... |
| | 130x150 | 5.11x5.90 | Not made | Not made | ..... |
| Bozier | 67x110 | 2.63x4.33 | Not made | Not made | ..... |
| | 65x130 | 2.55x5.11 | Not made | Not made | ..... |
| | 75x120 | 2.95x4.72 | No change | No change | 10.5 |
| | 75x150 | 2.95x5.90 | 75x130 | 2.95x5.11 | 13.9 |
| Brasier | 67x110 | 2.63x4.33 | No change | No change | 13.9 |
| | 70x120 | 2.75x4.72 | No change | No change | 11.1 |
| | 80x130 | 3.14x5.11 | No change | No change | 12.1 |
| | 85x140 | 3.34x5.51 | Not made | Not made | ..... |
| | 90x140 | 3.54x5.51 | No change | No change | 17.9 |
| | 100x150 | 3.93x5.90 | Not made | Not made | ..... |
| Buchet | 76x120 | 2.99x4.72 | No change | No change | 24.8 |
| Buile, La. .... | ..... | ..... | 76x120 | 2.99x4.72 | 14.3 |
| | 70x150 | 2.75x5.90 | 65x130 | 2.55x5.11 | 10.5 |
| | 75x130 | 2.95x5.11 | No change | No change | 12.1 |
| | 80x160 | 3.14x6.29 | Not made | Not made | ..... |
| | 85x140 | 3.34x5.51 | No change | No change | 15.8 |
| | 90x140 | 3.54x5.51 | No change | No change | 16.8 |
| | 90x160 | 3.54x6.29 | Not made | Not made | ..... |
| | 105x150 | 4.13x5.90 | No change | No change | 20.1 |
| Charron | 65x120 | 2.55x4.72 | Not made | Not made | ..... |
| | 80x120 | 3.14x4.72 | No change | No change | 10.5 |
| | 95x130 | 3.74x5.11 | No change | No change | 15.8 |
| | 110x150 | 4.33x5.90 | No change | No change | 22.4 |
| Ghenard & Walcker... | 65x120 | 2.55x4.72 | No change | No change | 30.0 |
| | 75x120 | 2.95x4.72 | 70x130 | 2.75x5.11 | 12.1 |
| | 80x150 | 3.14x5.90 | 75x150 | 2.95x5.90 | 13.9 |
| C. I. D. (non-poppet)... | 75x120 | 2.95x4.72 | No change | No change | 15.8 |
| C. L. C. (non poppet) | ..... | ..... | No change | No change | 13.9 |
| (1 cyl.) | 80x140 | 3.14x5.51 | No change | No change | ..... |
| Clement-Bayard | 60x120 | 2.36x4.72 | No change | No change | 3.9 |
|  | ..... | ..... | No change | No change | 10.1 |
| | 70x110 | 2.75x4.33 | 65x120 | 2.55x4.72 | 10.5 |
| | 80x120 | 3.14x4.72 | 75x110 | 2.95x4.33 | 13.9 |
|  | ..... | ..... | 80x130 | 3.14x5.11 | 15.8 |
| | 100x140 | 3.93x5.51 | 85x140 | 3.34x5.51 | 17.5 |
|  | ..... | ..... | *90x130 | 3.54x5.11 | 20.1 |
|  | ..... | ..... | Not made | Not made | ..... |
| Corre La Licorne..... | 70x120 | 2.75x4.72 | *100x140 | 3.93x5.51 | 24.8 |
| | 65x130 | 2.55x5.11 | 75x120 | 2.95x4.72 | 13.9 |
| | 75x150 | 2.95x5.90 | No change | No change | 10.5 |
| | 80x140 | 3.14x5.51 | No change | No change | 13.9 |
| | 100x140 | 3.93x5.51 | Not made | Not made | ..... |
| Cote (two cycle)..... | 65x 85 | 2.55x3.34 | Not made | Not made | ..... |
| | 75x105 | 2.95x4.13 | No change | No change | ..... |
| | 80x105 | 3.14x4.13 | 75x120 | 2.95x4.72 | 13.9 |
| | 90x120 | 3.54x4.72 | 80x120 | 3.14x4.72 | 15.8 |
| | 100x120 | 3.93x4.72 | No change | No change | 20.1 |
|  | ..... | ..... | No change | No change | 24.8 |

*Knight

Six-Cylinders Show No Gain in Numbers

Improvement in Flexibility of the Four and Increasing Cost of Fuel Are Important Factors Against Further Extension of the Six—Trend Is Toward Monoblock Types

method is adopted by Unic, Ballot, Chapsuis & Dornier, Sizaire & Naudin, Delahaye, Chenard & Walcker, de Dion Bouton, D. F. P., and Pilain. Delage, after using two bearings for his 75 millimeters motor, has adopted three for the coming season,

and all the firms mentioned above adopt three main bearings whenever their motors exceed 75 millimeters bore. Panhard, it may be mentioned, has decided on three bearings for the new 70 by 140 millimeters type just put on the market.

The disadvantages of two-bearing crankshafts outweigh the advantages when the size of the cylinders gets beyond 75 millimeters, and among the firms mentioned there are some who have had to redesign their motors with a stiffer shaft and longer bearings to get rid of the suspicion of whip when running heavily loaded.

Six-cylinder motors are not on the increase. Delaunay-Belleville makes a specialty of this type of motor and is one of the few firms building more sixes than fours. There are about half a dozen firms having abandoned some or all of their six-cylinder models, among these being some factories never having built more than a very small number of sixes, and there are about three firms bringing out a six for the first time. Improvements in the flexibility of the four and the increasing cost of fuel are important factors against the further extension of the six-cylinder motor.

Uniting Clutch and Gearbox

Although far from being in the majority, there is a pronounced tendency towards the adoption of unit construction for motor and gearbox. Panhard took this up a year ago and has extended it to all the models; D. F. P. has adopted it for the coming season; Gregoire has one model with the clutch and gearset united; F. L. has a power plant of this type; Hispano-Suiza and Piccard-Pictet have adopted this construction from the beginning; Motobloc, generally admitted to be the originator of this method, continues it; La Buire has adopted it, and it is very much favored by the Italian firms, Scap, Scat, etc. De Dion-Bouton makes use of it on some of the smaller models.

Although not likely to oust separate construction in the near future, the unit idea has made real progress. There are two distinct methods of treating the unit type. In the minority is the Hispano-Suiza school, where the unit is rigidly bolted to the frame or to inswept extensions of the frame so as to stiffen the entire construction, and in the majority of cases the unit is hung on three points.

The tendency is more and more towards monoblock motors, some of the four-cylinder castings being enormous pieces. Berliet, for instance, has cylinders of 100 by 140 cast together; Gregoire has changed from pair casting to block; Delage casts cylinders of 65 by 130 together; La Buire has single castings up to 90 by 160. Practically all motors up to 85 bore are in one casting, above this size opinions are di-

COMPARISON OF LEADING CONTINENTAL FOUR AND SIX-CYLINDER CARS AT PARIS SALON FOR 1912 AND 1913

| | 1912 | | 1913 | | H. P. English R. A. C. Rating. |
|-------------------------|---------------------------------|-----------|---------------------------------|-----------|---|
| | Bore and Stroke Millimeters. | Inches. | Bore and Stroke Millimeters. | Inches. | |
| Cottin & Desgouttes... | 70x120 | 2.75x4.72 | Not made | Not made | 15.8 |
| | 80x160 | 3.14x6.29 | No change | No change | 24.8 |
| | 100x140 | 3.93x5.51 | 100x160 | 3.93x6.29 | 35.7 |
| | 120x160 | 4.72x6.29 | No change | No change | 42.0 |
| | 130x200 | 5.11x7.87 | No change | No change | 10.8 |
| Crespelle | 65x110 | 2.55x4.33 | Not made | Not made | 13.9 |
| | 65x130 | 2.55x5.11 | No change | No change | 13.9 |
| | 75x120 | 2.95x4.72 | No change | No change | 13.9 |
| | 75x150 | 2.95x5.90 | No change | No change | 13.9 |
| | 85x160 | 3.34x6.29 | Not made | Not made | 13.9 |
| Darracq | 68x120 | 2.67x4.72 | Not made | Not made | 13.9 |
| | 75x120 | 2.95x4.72 | 75x120 | 2.95x4.72 | 13.9 |
| | 80x120 | 3.14x4.72 | Not made | Not made | 13.9 |
| | 100x140 | 3.93x5.51 | No change | No change | 17.9 |
| | 95x140 | 3.74x5.51 | 85x130 | 3.34x5.11 | 17.9 |
| | 80x130 | 3.14x5.11 | Not made | Not made | 10.5 |
| Delage | 62x110 | 2.44x4.33 | Not made | Not made | 13.9 |
| | 65x110 | 2.55x4.33 | No change | No change | 10.5 |
| | 75x120 | 2.95x4.72 | 75x130 | 2.95x5.11 | 13.9 |
| | 80x149 | 3.14x5.86 | Not made | Not made | 9.1 |
| Delahaye | 62x100 | 2.44x3.93 | No change | No change | 13.9 |
| | 75x110 | 2.95x4.33 | No change | No change | 17.9 |
| | 85x130 | 3.34x5.11 | No change | No change | 22.4 |
| | 95x130 | 3.74x5.11 | No change | No change | 18.5 |
| Delaunay-Belleville ... | 85x130 | 3.34x5.11 | No change | No change | 24.8 |
| | 100x140 | 3.93x5.51 | No change | No change | 5.4 |
| De Dion Bouton—2 cyl. | 66x120 | 2.59x4.72 | No change | No change | 10.8 |
| | 1 cyl. 84x130 | 3.30x5.11 | Not made | Not made | 10.8 |
| | 2 cyl. 75x130 | 2.95x5.11 | Not made | Not made | 13.9 |
| | 66x120 | 2.59x4.72 | No change | No change | 15.8 |
| | 70x130 | 2.75x5.11 | 75x130 | 2.95x5.11 | 24.8 |
| | 80x140 | 3.14x5.51 | No change | No change | 10.5 |
| | 100x140 | 3.93x5.51 | No change | No change | 12.1 |
| D. F. P. | 65x120 | 2.55x4.72 | No change | No change | 15.8 |
| | 70x130 | 2.75x5.11 | No change | No change | 17.9 |
| | 80x150 | 3.14x5.90 | No change | No change | 15.8 |
| Excelsior | 85x130 | 3.34x5.11 | No change | No change | 15.8 |
| F. L. | 80x100 | 3.14x3.93 | No change | No change | 11.8 |
| F. N. | 74x 90 | 2.91x3.54 | 69x130 | 2.71x5.11 | 17.9 |
| | 80x120 | 3.14x4.72 | 85x120 | 3.34x4.72 | 12.1 |
| | 125x140 | 4.92x5.51 | Not made | Not made | 15.8 |
| Fiat | 70x120 | 2.75x4.72 | No change | No change | 24.8 |
| | 80x130 | 3.14x5.11 | 80x140 | 3.14x5.51 | 30.0 |
| | 100x140 | 3.93x5.51 | No change | No change | 18.4 |
| | 110x150 | 4.33x5.90 | No change | No change | 21.0 |
| | 130x170 | 5.11x6.69 | Not made | Not made | 15.8 |
| | 130x190 | 5.11x7.48 | Not made | Not made | 25.8 |
| Germain | 86x110 | 3.38x4.33 | No change | No change | 35.7 |
| | 92x110 | 3.62x4.33 | No change | No change | 13.9 |
| | 80x130 | 3.14x5.11 | No change | No change | 15.8 |
| | 102x110 | 4.01x4.33 | No change | No change | 30.0 |
| | 120x130 | 4.72x5.11 | No change | No change | 15.8 |
| Gobron | 70x150 | 2.75x5.90 | No change | No change | 20.1 |
| | 90x180 | 3.54x7.08 | 80x160 | 3.14x6.29 | 30.0 |
| | 110x250 | 4.33x9.84 | No change | No change | 6.2 |
| Gregoire (2 cycle).... | 80x110 | 3.14x4.33 | Not made | Not made | 10.5 |
| (1 cycle) ..... | ..... | ..... | 65x130 | 2.55x5.11 | 15.8 |
| | 80x110 | 3.14x4.33 | No change | No change | 15.8 |
| | 80x160 | 3.14x6.29 | 80x130 | 3.14x5.11 | 15.8 |
| Hispano-Suiza | 80x110 | 3.14x4.33 | No change | No change | 15.8 |
| | 80x130 | 3.14x5.11 | No change | No change | 15.8 |
| | 80x180 | 3.14x7.08 | No change | No change | 15.8 |
| Hotchkiss | 80x120 | 3.14x4.72 | No change | No change | 15.8 |
| | 95x130 | 3.74x5.11 | No change | No change | 22.4 |
| | 110x150 | 4.33x5.90 | No change | No change | 30.0 |
| Hurtu | 70x100 | 2.75x3.93 | 70x110 | 2.75x4.33 | 12.1 |
| | 80x110 | 3.14x4.33 | 75x120 | 2.95x4.72 | 13.9 |
| | 90x120 | 3.54x4.72 | Not made | Not made | 13.9 |
| | 105x130 | 4.13x5.11 | Not made | Not made | 13.9 |
| Isotta-Fraschini | 74x130 | 2.91x5.11 | 75x130 | 2.95x5.11 | 17.9 |
| | 85x130 | 3.34x5.11 | No change | No change | 24.8 |
| | 110x160 | 4.33x6.29 | 100x140 | 3.92x5.51 | 30.0 |
| | 105x180 | 4.13x7.08 | No change | No change | 27.3 |
|  | ..... | ..... | 130x200 | 5.11x7.87 | 42.0 |
| Itala | 75x110 | 2.95x4.33 | Not made | Not made | 14.7 |
| | 77x120 | 3.03x4.72 | No change | No change | 20.1 |
| | 90x130 | 3.54x5.11 | No change | No change | 32.8 |
| | 115x130 | 4.52x5.11 | No change | No change | 20.1 |
| | 100x130 | 3.54x5.11 | †No change | No change | 27.3 |
| Itala | 130x140 | 5.11x5.51 | Not made | Not made | 48.6 |
| | 105x150 | 4.13x5.90 | No change | No change | 39.9 |
| | 140x150 | 5.51x5.90 | No change | No change | |
| | 127x160 | 5.00x6.29 | No change | No change | |

* Knight.

† Non-poppet.

vided, the majority favoring pair casting. Single casting is practically unknown except by some of the firms using the Knight motor in big sizes.

Silent-chain drive for cam and magneto shafts has made enormous progress. It would perhaps be easier to give the names of the firms not using it than those having adopted it. The former list would include some important firms, for it is precisely those factories having such a reputation that they can afford to be conservative, which have remained true to meshing pinions. Panhard, usually classed with the conservative school, has made use of a chain for the poppet-valve models, after having had lengthy experience with it on the Knight motors. Sizaire-Naudin, after using it on one model, has extended it to all. Chenard-Walcker uses it throughout the series, from the small four to the big six. The use of one or two chains and the provision for adjustment or not are debatable points. The majority appear to have made use of a single chain on three points, one of these, the magneto shaft, being adjustable.

It is the method adopted by Chenard-Walcker, where the magneto platform has a transverse adjustment to take up the slack of the chain. The same idea is used by Ballot on most of his motors. Delage, on the other hand, prefers the use of two chains—crankshaft to camshaft and camshaft to magneto shaft, without adjustment. The main feature is that after a couple of years' experience chains have not given trouble, are being continued by those having tried them, and taken up by others.

Thermo-Syphon Cooling

Thermo-syphon cooling is in a majority if the exhibition as a whole is considered. But if the cars are separated into classes it will be found that pump and natural flow are about equally divided for the more powerful motors. Hotchkiss, Delaunay-Belleville, Panhard, Unic, Peugeot retain the pump for all their models, or, at any rate, for all those of more than moderate power. The claim is no longer made that natural circulation is inefficient under strenuous conditions, but the claim is made that for very big motors the quantity of water that must be carried outweighs the advantage of abolishing one supplementary organ. Renault and Charon still head the list of firms making use of thermo-syphon for the whole series of motors.

There can only be one opinion regarding ignition. A single high-tension magneto, with fixed advance in the small powers and variable advance for the larger models, is found on at least 95 per cent of the cars in the show. Storage batteries for ignition purposes are as dead as the dodo. Even the attempts to popularize a double ignition with one set of plugs, as brought out by both Bosch and Eisemann a couple of years ago, has failed to find favor. In most cases this was fitted with

COMPARISON OF LEADING CONTINENTAL FOUR AND SIX-CYLINDER CARS AT PARIS SALON FOR 1912 AND 1913

| FIRM | 1912 | | 1913 | | H. P. English R. A. C. Rating. |
|-------------------|------------------------------------|------------|------------------------------------|-----------|---|
| | Bore and Stroke Millimeters. | Inches. | Bore and Stroke Millimeters. | Inches. | |
| Lancia | 100x130 | 3.93x5.11 | No change | No change | 24.8 |
| Lorraine-Dietrich | 75x120 | 2.95x4.72 | No change | No change | 13.9 |
| | 90x130 | 3.54x5.11 | No change | No change | 20.1 |
| | 110x150 | 4.33x5.90 | Not made | Not made | .... |
| | 125x160 | 4.92x6.29 | 125x170 | 4.92x6.69 | 38.8 |
| Martini | 80x120 | 3.14x4.72 | No change | No change | 15.8 |
| | 90x140 | 3.54x5.51 | No change | No change | 20.1 |
| | 110x140 | 4.33x5.51 | Not made | Not made | .... |
| | 125x140 | 4.92x5.51 | Not made | Not made | .... |
| | 70x120 | 2.75x4.72 | 90x140 | 3.54x5.51 | 20.1 |
| Mercedes | 80x130 | 3.14x5.11 | No change | No change | 12.1 |
| | 90x140 | 3.54x5.51 | No change | No change | 15.8 |
| | 110x150 | 4.33x5.90 | No change | No change | 20.1 |
| | 125x150 | 4.92x5.90 | No change | No change | 30.0 |
| | 140x160 | 5.51x6.29 | No change | No change | 24.8 |
| | 130x180 | 5.11x7.08 | No change | No change | 35.7 |
| Metallurgique | 80x130 | 3.14x5.11 | No change | No change | 48.6 |
| | 90x140 | 3.54x5.51 | No change | No change | 42.0 |
| | 102x150 | 4.01x5.90 | No change | No change | 13.9 |
| | 125x150 | 4.92x5.90 | No change | No change | 15.8 |
| Minerva | 82x110 | 3.22x4.33 | No change | No change | 20.1 |
| | 102x125 | 4.01x4.92 | 75x120 | 2.95x4.72 | 25.8 |
| | 124x130 | 4.88x5.11 | Not made | Not made | 38.8 |
| | 80x125 | 3.14x4.92 | Not made | Not made | 13.9 |
| | 100x140 | 3.93x5.51 | 90x130 | 3.54x5.11 | .... |
| | 124x150 | 4.88x5.90 | No change | No change | 20.1 |
| Mors | 75x120 | 2.95x4.72 | No change | No change | 24.8 |
| | 80x120 | 3.14x4.72 | No change | No change | 38.2 |
| | 100x140 | 3.93x5.51 | 85x150 | 3.34x5.90 | 17.9 |
| | 65x120 | 2.55x4.72 | Not made | Not made | .... |
| | 80x120 | 3.14x4.72 | 75x120 | 2.95x4.72 | .... |
| | 90x130 | 3.54x5.11 | 90x130 | 3.54x5.11 | 13.9 |
| | 100x140 | 3.93x5.51 | 100x140 | 3.93x5.51 | 20.1 |
| | 124x150 | 4.88x5.90 | 124x150 | 4.88x5.90 | 24.8 |
| Motobloc | 65x120 | 2.55x4.72 | No change | No change | 38.2 |
| | 80x120 | 3.14x4.72 | No change | No change | 10.5 |
| | 80x148 | 3.14x5.82 | No change | No change | 15.8 |
| | 90x130 | 3.54x5.11 | No change | No change | 15.8 |
| | 90x160 | 3.54x6.29 | No change | No change | 20.1 |
| | 100x140 | 3.93x5.51 | Not made | Not made | 20.1 |
| N. A. G. | 75x85 | 2.95x3.34 | Not made | Not made | .... |
| | 75x118 | 2.95x4.64 | 75x85 | 2.95x3.34 | 13.9 |
| | 83x120 | 3.26x4.72 | 75x118 | 2.95x4.64 | 13.9 |
| | 90x130 | 3.54x5.11 | 83x120 | 3.26x4.72 | 17.1 |
| | 115x125 | 4.52x4.92 | No change | No change | 20.1 |
| | 130x160 | 5.11x6.29 | 115x125 | 4.52x4.92 | 32.8 |
| Nagent Freres | 70x118 | 2.75x4.64 | 130x160 | 5.11x6.29 | 42.0 |
| | 90x120 | 3.54x4.72 | 75x118 | 2.95x4.64 | 13.9 |
| | 90x130 | 3.54x5.11 | 83x120 | 3.26x4.72 | 17.1 |
| | 106x130 | 4.17x5.11 | No change | No change | 20.1 |
| | 106x150 | 4.17x5.90 | 115x125 | 4.52x4.92 | 32.8 |
| Nazzaro | 100x140 | 3.93x5.51 | 130x160 | 5.11x6.29 | 42.0 |
| Opel | 65x95 | 2.55x3.74 | No change | No change | 24.8 |
| | 70x100 | 2.75x3.93 | 65x98 | 2.55x3.85 | 10.5 |
| | 75x115 | 2.95x4.52 | No change | No change | 12.1 |
| | 115x150 | 4.52x5.90 | No change | No change | 13.9 |
| | 130x165 | 5.11x6.49 | 70x135 | 2.75x5.31 | 12.1 |
| Panhard-Lavassor | 80x120 | 3.14x4.72 | 84x118 | 3.30x4.64 | 17.5 |
| (2 cylinder) | 80x120 | 3.14x4.72 | 90x130 | 3.54x5.11 | 20.1 |
| | 90x130 | 3.54x5.11 | 105x135 | 4.13x5.31 | 27.3 |
| | 100x130 | 3.93x5.11 | No change | No change | 32.8 |
| Peugeot | 70x130 | 2.75x5.11 | 120x144 | 4.72x5.66 | 35.7 |
| | 80x130 | 3.14x5.11 | No change | No change | 42.0 |
| | 90x150 | 3.54x5.90 | Not made | Not made | .... |
| | 92x150 | 3.62x5.90 | 70x140 | 2.75x5.51 | 12.1 |
| | 100x160 | 3.93x6.29 | No change | No change | 15.8 |
| | 110x160 | 4.33x6.29 | No change | No change | 15.8 |
| Piccard-Pictet | 80x120 | 3.14x4.72 | 80x130 | 3.14x5.11 | 20.1 |
| | 90x130 | 3.54x5.11 | 80x140 | 3.14x5.51 | 20.1 |
| | 110x140 | 4.33x5.51 | 90x150 | 3.54x5.90 | 20.1 |
| | 110x160 | 4.33x6.29 | 90x170 | 3.54x6.69 | 20.1 |
| Pilain | 65x120 | 2.55x4.72 | 100x150 | 3.93x5.51 | 24.8 |
| | 75x110 | 2.95x4.33 | No change | No change | 10.5 |
| | 90x120 | 3.54x4.72 | 55x110 | 2.16x4.33 | 7.5 |
| | 100x120 | 3.93x4.72 | No change | No change | 13.9 |
| | 124x140 | 4.88x5.51 | No change | No change | 20.1 |
| Pipe | 75x110 | 2.95x4.33 | 85x185 | 3.34x7.28 | 17.9 |
| | 80x150 | 3.14x5.90 | 100x140 | 3.93x5.51 | 24.8 |
| | 100x180 | 3.93x7.08 | No change | No change | 38.2 |
| | 90x105 | 3.54x4.13 | No change | No change | 15.9 |
| | 140x180 | 5.51x7.08 | No change | No change | 15.8 |
| Renault | 70x110 | 2.75x4.33 | Not made | Not made | 24.8 |
| | 80x120 | 3.14x4.72 | No change | No change | 48.6 |
| | 90x140 | 3.54x5.51 | No change | No change | .... |
| | 100x160 | 3.93x6.29 | No change | No change | .... |
| | 130x160 | 5.11x6.29 | No change | No change | .... |
| Rolland-Pilain | 70x110 | 2.75x4.33 | No change | No change | .... |
| | 80x110 | 3.14x4.33 | No change | No change | .... |
| | 80x140 | 3.14x5.51 | No change | No change | .... |
| | 85x140 | 3.34x5.51 | No change | No change | .... |
| | 105x150 | 4.13x5.90 | No change | No change | .... |
| | 110x165 | 4.33x6.49 | No change | No change | .... |
| | 130x165 | 5.11x6.49 | No change | No change | .... |
| | 130x270 | 5.11x10.63 | No change | No change | .... |

* Knight
† Non-poppet

COMPARISON OF LEADING CONTINENTAL FOUR AND SIX-CYLINDER CARS AT PARIS SALON FOR 1912 AND 1913

| | 1912 | | 1913 | | H. P. English R. A. C. Rating. |
|-------------------------|---------------------------------|-----------|---------------------------------|-----------|---|
| | Bore and Stroke Millimeters. | Inches. | Bore and Stroke Millimeters. | Inches. | |
| Rosell | 65x130 | 2.55x5.11 | No change | No change | 10.5 |
| | 75x150 | 2.95x5.90 | No change | No change | 13.9 |
| | 90x110 | 3.54x4.33 | No change | No change | 20.1 |
| | 80x110 | 3.14x4.33 | No change | No change | 15.8 |
| Georges Roy | 80x120 | 3.14x4.72 | 80x130 | 3.14x5.11 | 15.8 |
| | 90x140 | 3.54x5.51 | No change | No change | 20.1 |
| Sava | 70x110 | 2.75x4.33 | Not made | Not made | ... |
| | 75x140 | 2.95x5.51 | No change | No change | 13.9 |
| | 80x140 | 3.14x5.51 | 82x140 | 3.22x5.51 | 16.6 |
| | | | 100x160 | 3.93x6.29 | 24.8 |
| Scar | 69x140 | 2.71x5.51 | Not made | Not made | ... |
| | 80x140 | 3.14x5.51 | No change | No change | 15.8 |
| Scat | 85x130 | 3.34x5.11 | No change | No change | 17.9 |
| | 102x140 | 4.01x5.51 | No change | No change | 25.8 |
| Schneider | 70x120 | 2.75x4.72 | No change | No change | 12.1 |
| | | | 75x130 | 2.95x5.11 | 13.9 |
| | 80x130 | 3.14x5.11 | 80x140 | 3.14x5.51 | 15.8 |
| | 95x130 | 3.74x5.11 | 95x150 | 3.74x5.90 | 22.4 |
| | 105x150 | 4.13x5.90 | 110x160 | 4.33x6.29 | 30.0 |
| Sizaire-Naudin (1-cyl.) | 120x140 | 4.72x5.51 | Not made | Not made | ... |
| | 70x170 | 2.75x6.69 | No change | No change | 12.1 |
| | | | 65x110 | 2.55x4.33 | 10.5 |
| | | | 75x120 | 2.95x4.72 | 13.9 |
| Spa | 70x120 | 2.75x4.72 | No change | No change | 12.1 |
| | 85x120 | 3.34x4.72 | No change | No change | 17.9 |
| | 100x140 | 3.93x5.51 | No change | No change | 24.8 |
| | 130x145 | 5.11x5.70 | 110x200 | 4.33x7.87 | 20.0 |
| Stimula | 70x110 | 2.75x4.33 | 75x120 | 2.95x4.72 | 13.9 |
| | 80x110 | 3.14x4.33 | No change | No change | 15.8 |
| | 80x140 | 3.14x5.51 | No change | No change | 15.8 |
| Turcat-Mery | 80x130 | 3.14x5.11 | No change | No change | 15.8 |
| | 90x130 | 3.54x5.11 | No change | No change | 20.1 |
| | 100x130 | 3.93x5.11 | No change | No change | 24.8 |
| | | | 110x160 | 4.33x6.29 | 30.0 |
| Unic | | | 65x110 | 2.55x4.33 | 10.5 |
| | 75x120 | 2.95x4.72 | No change | No change | 13.9 |
| | 90x120 | 3.54x4.72 | 90x130 | 3.54x5.11 | 20.1 |
| | 102x116 | 4.01x4.56 | Not made | Not made | ... |
| Vermorel | | | 66x120 | 2.59x4.72 | 10.5 |
| | 74x120 | 2.91x4.72 | No change | No change | 13.4 |
| | 90x130 | 3.54x5.11 | No change | No change | 20.1 |
| Vinot | 70x110 | 2.75x4.33 | No change | No change | 12.1 |
| | 80x110 | 3.14x4.33 | 80x130 | 3.14x5.11 | 15.8 |
| | 102x130 | 4.01x5.11 | 101x130 | 3.97x5.11 | 25.2 |
| Vivinus | 80x120 | 3.14x4.72 | No change | No change | 15.8 |
| | 90x130 | 3.54x5.11 | No change | No change | 15.8 |
| Zebre | 68x120 | 2.67x4.72 | 50x100 | 1.96x3.93 | 6.2 |
| Zebre | 50x100 | 1.96x3.93 | No change | No change | 6.2 |
| | 68x120 | 2.67x4.72 | No change | No change | 11.3 |
| Zedel | 72x120 | 2.83x4.72 | No change | No change | 12.8 |
| | 82x120 | 3.22x4.72 | Not made | Not made | ... |
| | 90x140 | 3.54x5.51 | No change | No change | 20.1 |

COMPARISON OF CONTINENTAL SIX AND EIGHT-CYLINDER CARS AT PARIS SALON FOR 1912 AND 1913

| SIX-CYLINDER CARS | | | | | |
|---------------------|----------|-----------|-----------|-----------|------|
| Aries | 60x100 | 2.36x3.93 | No change | No change | 15.0 |
| | 75x120 | 2.95x4.72 | No change | No change | 20.9 |
| Bazelaire | 75x110 | 2.95x4.33 | 75x120 | 2.95x4.72 | 20.9 |
| Bollee, Leon | 83x110 | 3.26x4.33 | No change | No change | 25.6 |
| | 106x130 | 4.17x5.11 | Not made | Not made | ... |
| | 130x150 | 5.11x5.90 | Not made | Not made | ... |
| Brasier | 90x140 | 3.54x5.51 | No change | No change | 30.2 |
| | 112x130 | 4.40x5.11 | Not made | Not made | ... |
| Buile, La. | 85x140 | 3.34x5.51 | No change | No change | 26.4 |
| | 90x140 | 3.54x5.51 | No change | No change | 30.2 |
| Charron | 80x120 | 3.14x4.72 | No change | No change | 24.4 |
| | 95x130 | 3.74x5.11 | No change | No change | 33.6 |
| Chenard & Walcker | 80x150 | 3.14x5.90 | No change | No change | 23.8 |
| Clement-Bayard | | | 70x110 | 2.75x4.33 | 18.2 |
| | 80x120 | 3.14x4.72 | No change | No change | 24.4 |
| | 100x140 | 3.93x5.51 | No change | No change | 37.2 |
| Darracq | 85x120 | 3.34x4.72 | Not made | Not made | ... |
| | 100x140 | 3.93x5.51 | Not made | Not made | ... |
| Delage | 66x125 | 2.59x4.92 | 65x130 | 2.55x5.11 | 15.7 |
| Delahaye | 75x120 | 2.95x4.72 | No change | No change | 20.9 |
| Delanay-Belleville | 72x120 | 2.83x4.72 | No change | No change | 18.3 |
| | 85x130 | 3.34x5.11 | No change | No change | 26.2 |
| | 100x140 | 3.93x5.51 | No change | No change | 37.2 |
| D. F. P. | 80x130 | 3.14x5.11 | Not made | Not made | ... |
| Excelsior | 85x130 | 3.34x5.11 | No change | No change | 26.8 |
| F. L. | 80x100 | 3.14x3.93 | No change | No change | 24.3 |
| Fiat | 80x130 | 3.14x5.11 | No change | No change | 24.3 |
| Gregoire | 80x120 | 3.14x4.72 | Not made | Not made | ... |
| Hotchkiss | 95x110 | 3.74x4.33 | Not made | Not made | ... |
| | 95x130 | No change | No change | No change | 33.6 |
| Itala | 130x140m | 5.11x5.51 | Not made | Not made | ... |
| Mercedes | 120x150 | 4.72x5.90 | No change | No change | 53.5 |
| Mors | | | 85x150 | 3.34x5.90 | 26.2 |
| Motobloc | 80x120 | 3.14x4.72 | Not made | Not made | ... |
| | 80x148 | 3.14x5.82 | Not made | Not made | ... |
| Panhard Levassor | 90x130 | 3.54x5.11 | Not made | Not made | ... |
| | 100x140 | 3.93x5.51 | No change | No change | 37.2 |
| Pilain | 65x120 | 2.55x4.72 | No change | No change | 15.7 |
| Pipe | 90x140 | 3.54x5.51 | Not made | Not made | ... |
| | 105x123 | 4.13x4.84 | Not made | Not made | ... |
| Renault | 80x140 | 3.14x5.51 | No change | No change | 24.3 |
| | 100x160 | 3.93x6.29 | No change | No change | 37.2 |
| Roy, Georges | 80x120 | 3.14x4.72 | No change | No change | 24.3 |
| Schneider | 75x120 | 2.95x4.72 | 75x130 | 2.95x5.11 | 20.9 |
| Spa | 95x120 | 3.74x4.72 | Not made | Not made | ... |
| | 130x145 | 5.11x5.70 | Not made | Not made | ... |
| EIGHT-CYLINDER CARS | | | | | |
| De Dion-Bouton | 70x130 | 2.75x5.11 | 75x130 | 2.95x5.11 | 27.8 |
| | 90x140 | 3.54x5.51 | 94x140 | 3.70x5.51 | 44.0 |

* Knight

a view to starting up on the switch, but results were so uncertain, some motors starting well and other equally good makes refusing to start except under most favorable circumstances, that it was usually not considered worth while to keep a battery in service.

It should be borne in mind that European motors as a rule are of comparatively small size, and the cranking of them does not present any great difficulty. Both magneto and carburetor manufacturers have made it their business to build appliances which make for easy starting, and as to the possibility of a breakdown, the average European motorist looks upon his magneto as the most reliable piece of mechanism on the car. Automatic advancing magnetos have not made much progress. Fixed point ignition is in the majority, but this is merely because of a desire to make the car fool proof. In the higher grade cars, generally handled by skilled men, it is the custom to fit variable advance.

NEW WASHINGTON SHOW ANGLE

Washington, D. C., Dec. 14—The motor car show proposition took a new angle this week when a number of the dealers met and organized and incorporated the Automobile Dealers' Association of Washington, the primary object of which will be to promote the show scheduled for February 3-8. The new organization will have complete control of the show. T. Oliver Probey was elected chairman of the show committee; C. W. Semmes, vice chairman; E. A. Garlock, secretary; F. C. Sibbald, treasurer; governors, Arthur Foraker, J. H. Miller, F. W. Robartes, I. J. Henderson, J. H. Earle, T. Lamar Jackson, Bruce Emerson.

The officers of the dealers' association for the first year will be as follows: President, T. Oliver Probey; vice-president, Charles W. Semmes; secretary, E. A. Garlock; treasurer, F. C. Sibbald. The board of directors will consist of Arthur Foraker, J. H. Miller, I. J. Henderson, J. H. Earle, and Bruce Emerson.

The interesting fact in connection with the above is that all the dealers named are comparatively new in the trade and opposing them in the show proposition are dealers who are known as the old guard.

CHAPIN BOARD OF TRADE SECRETARY

New York, Dec. 16—Roy D. Chapin, of the Hudson Motor Car Co., has been elected secretary of the Automobile Board of Trade, vice Benjamin Briscoe, resigned. John North Willys, of the Willys-Overland Co., has been chosen to the vacancy in the board of directors caused by the election of Mr. Chapin and the resignation of Mr. Briscoe.

The annual meeting of the Automobile Board of Trade is scheduled for next month when a full list of officers will be chosen. The present election was to fill out the unexpired term of Mr. Briscoe.



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Controlling Traffic

CHICAGO is putting into practice a reform in the handling of its traffic in the congested business district inside the loop—the controlling of pedestrians by means of whistles blown by the crossing policemen. For a couple of years vehicles operating inside the loop have been handled in this manner, the ebb and flow of traffic being controlled by the shrill blasts as if the drivers were automatons. Now the education of the pedestrian has been started, with the same object in view—facilitating the progress of both foot passengers and vehicles. Time is money in the business districts of big cities and a short cut to this kind of wealth is by means of traffic control.

THE police of Chicago have tried only one four corners as yet—Madison and State streets, possibly the busiest spot in the western metropolis. The control of pedestrians is attempted only during the noon hour, but so far the attempt has worked out well, although the people on foot hardly can understand why it is not perfectly proper to dash in between teams and slow the vehicular traffic as they used to do.

KANSAS CITY has a similar rule which it has been enforcing for some time; but Chicago is the first of the really big cities to attempt anything of the sort. It's a different proposition altogether from the one that faces Kansas City, so New York, Philadelphia, Boston and others will have to wait until Chicago threshes out its problem.

THE business world can thank the motor car for this, for it was not until the power-propelled vehicle became so common on the city streets that the authorities realized just how much time was being wasted by everyone in getting around. Then came the systematizing of the problem. Speed was demanded, but it is only by handling traffic in a systematic manner that this speed can be attained.

IT may be said that the era of standardization of traffic control is almost here. New York has gained a flying start and in the eastern metropolis the drivers have learned their lesson so well that the whistle has been abandoned. Now the uplifted hand of the bluecoat is all-powerful. Drivers know that to ignore that uplifted hand means swift and sure punishment and they obey. When the pedestrians have been taught the same lesson, then New York will have solved the traffic problem.

THE ideal conditions that seem to await in the near future will see every one working for the common good. The policeman on the crossing will be the pendulum that swings the crowd. When he holds up his hand pedestrians and drivers going north or south will halt in order that their fellows going east and west may have right of way. There will be no dodging pedestrians in the way.

The French Aggression

MOTOR AGE this week in its first story of the Paris salon coming direct from its Paris correspondent again reiterates the one prominent fact, namely, that the foreigner has nearly run away from us in the matter of design. France has spoken on the long-stroke type of motor, not the extreme type of 2 or 3 years ago, but the rational type, a type evolved from wide experience in contests and much wider experience in touring work. In unmistakable terms the French maker has announced his stand: Fifty per cent of the motor models on view in Paris at present are in the 1.5 to 1 stroke-bore ratio class, in other words these motors have a stroke which is one-half longer than the bore. But the French maker has gone further and has thirty-three makers who have models with a 2 to 1 stroke-bore ratio, in other words, the stroke is exactly twice the bore.

IN the early days of the long-stroke motor abroad, the newer concerns took up the burden of exploitation and the older concerns displayed that reluctance which characterizes some of the oldest American concerns. But the new blood won out. It demonstrated conclusively that the long-stroke motor has merits, that it has economy and that whereas it disclosed shortcomings in its pioneer days, these have been eliminated by the present generation of designers who have been studying the proposition.

TODAY the conservative French maker has come out for the long-stroke motor. One of the oldest houses, a firm known from the inception of the motor industry as a firm of conservatism, has brought out a new motor with 2 to 1 ratio. It has had this motor in the hands of testers for over a year. Every detail has been thoroughly established, and the product goes on the market as a known quantity and not a conjecture.

EUROPEAN engineers have demonstrated to their entire satisfaction that one set of ignition is sufficient and that where two sets are fitted it either means that the company has not confidence in its equipment or does not know that one set is enough. The single magneto has demonstrated during the last 2 years that it is sufficiently reliable to meet all exigencies; and where other systems are used they should be brought to that point of reliability where an auxiliary system is needless. One ignition system is the watchword of Europe today and it should be the slogan of every American buyer. Why two? They are not needed.

EUROPE has also spoken in the matter of body styles. Not a few of our American builders announce with apparent pride that they do not need to make body changes, and content themselves. If they are sufficiently fortunate to keep the buyer satisfied with the present, it is an excellent commendation of their selling ability, but the fact still stands that the average body of today is a two-part affair—a hood or bonnet and a body part. The same hood serves for a runabout, a touring model, a town cab or limousine. There has not been any effort to develop a design which begins with the radiator and ends in the baggage rack. France is striving for this new ideal—a body that is a unit design, a body intended to be the most pleasing to the eye, the most comfortable to the tourists and the lightest. Others are striving valiantly to eliminate dust by underpan designs and general body lines, and they are credited with meeting with considerable success in their efforts to bring this about.

Colorado Boosting the Midland Trail

DENVER, Colo., Dec. 14—The campaign just recently instituted by the Denver Motor Club and the Denver chamber of commerce to secure a membership of 5,000 for the Denver branch of the Colorado-Utah Midland Trail Association has just been given a substantial stimulus by encouraging word of the rousing support being given this transcontinental highway enterprise by the motor, good roads and commercial organizations, and also the city officials, of Salt Lake City, Utah. William D. Nash, president of the Denver Motor Club, is in receipt of the following telegram from the Mormon metropolis:

Enthusiastic meeting held tonight. Local council of Colorado-Utah link of Midland trail organized. Five thousand members is the mark.

The Denver branch probably will complete its organization within the next few days and also perfect the working out of its plans for a systematic and thorough membership campaign, in which all the commercial bodies of the city will be called upon to co-operate.

A plan is also under way to make proper provision for sending delegates to present Colorado's claims before the principal eastern meetings of the Ocean-to-Ocean Highway Association, which is to determine the route to be established as the first official hard-surfaced highway from coast to coast.

The people of Colorado feel that the scenic and climatic advantages of this state ought to be far more widely known and better appreciated as vital factors in determining a route for motor touring. They also hold that the Colorado-Utah link of the proposed Midland trail, in addition to affording the most magnificent mountain scenery in America, could be put into excellent condition at a very reasonable cost.

All along the proposed route through these two states the people are pledging themselves to give ample co-operation in the improvement work. They also point out that this route misses both the extreme cold of the north and the extreme heat of the south,

Denver Particularly Active in Seeking Road Improvements

and urge that it would be open to comfortable travel more months in the year than any other transcontinental highway thus far proposed.

These are some of the features they are anxious to have brought before the promoters of the hard-surfacing project by personal representatives fully acquainted with the essential factors involved.

The good roads movement is receiving

earnest consideration in northern Colorado, according to a report just received relative to a joint meeting of the county commissioners of Routt, Moffat and Grand counties, held at Steamboat Springs, Wednesday night. The conference resulted in a definite determination to rebuild the present wagon road through Steamboat Springs and over Gore range and have it in proper shape for motor travel next summer. The promoters of this new enterprise are so enthusiastic that they intend to begin the improvement work at once and carry it on throughout the winter.

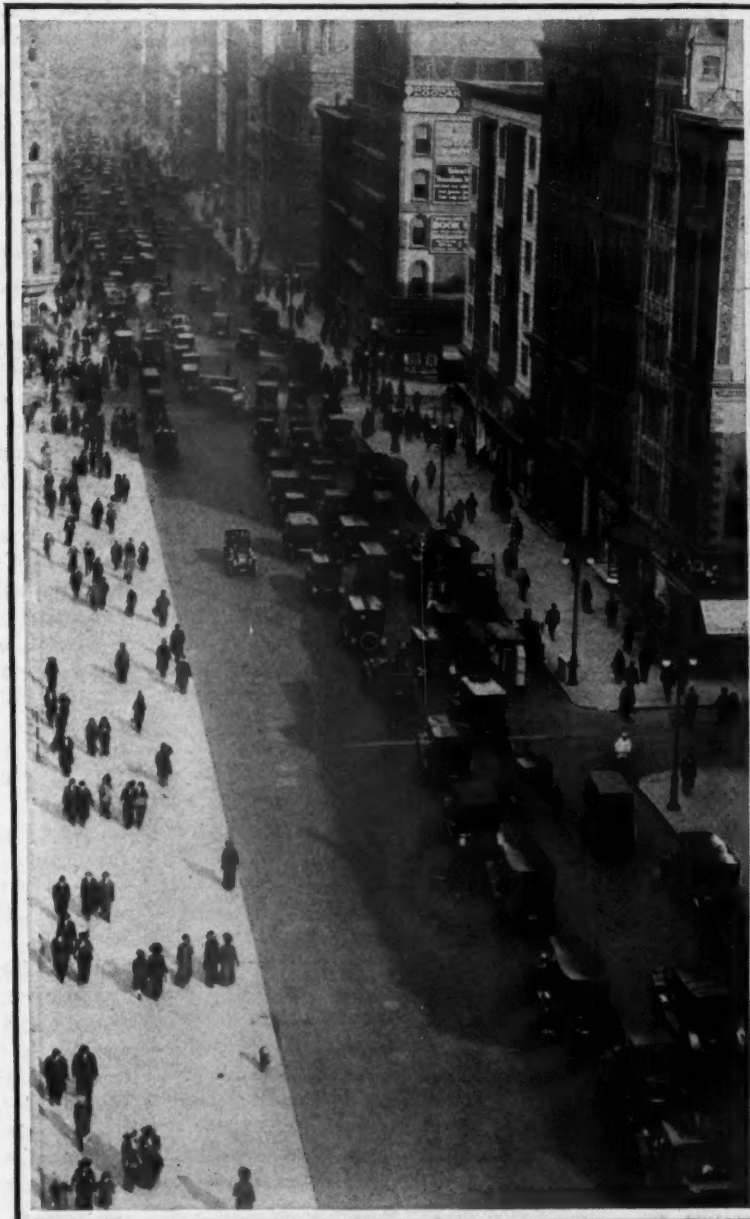
According to the plan agreed upon, the road will be put into good condition through westward to the point on the Utah line reached by the Vernal-Salt Lake City road, and eastward as far as Kremmling, thus establishing a through, air-line highway between Denver and Salt Lake City through northern Colorado. The Utah link of the new route is already being improved by the commissioners of Wasatch and Uintah counties, Utah.

It has been further decided by the northern Colorado good roads boosters to co-operate with Grand Junction, Glenwood Springs and other mid-state points to secure the official adoption of the proposed Midland trail. The northern route is to be supplementary rather than competitive, and is planned to assist the development of that rich section of the state.

PENN'S ROAD PROGRESS

Harrisburg, Pa., Dec. 16—Seventy miles of road have been rebuilt by the state highway department since the reorganization of that branch of the state government less than 18 months ago, and now contracts have been let for hundreds of thousands of feet of additional roadway which will be a part of the new state system or be under control of counties and townships according to the method by which the construction was authorized.

Figures compiled of the work show that up to November 1 4,573,699 feet or 866 miles of highway had been rebuilt by the state.



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THE ADVANCE ARMY OF CHRISTMAS SHOPPERS.

THE Christmas spirit is strikingly displayed by the early shoppers whizzing their way up and down Fifth avenue, New York, in their motor cars. The illustration, taken from in front of the Astor library, gives one only a glimpse of the awe-inspiring wealth, splendor and enterprise displayed in this most famous American city.

Stoddard Loses Its Knight License

CHICAGO, Dec. 17—Formal notice of the cancellation of the license of the Dayton Motor Car Co., of Dayton, O., maker of the Stoddard-Dayton, to manufacture the Silent Knight motor was mailed the receivers of the United States Motor Co., in New York today by L. B. Kilbourne, vice-president of the Knight & Kilbourne Patents Co., holder of the patents. This step was taken in accordance with a clause in the contract which gives to the holders of the patents the right to cancel any license when the concern to which the license has been granted has become involved in litigation.

This cancellation does not necessarily mean the Knight engine can no longer be used by the Stoddard-Dayton people. They can continue to use the sleeve-valve but they must buy the motors from some other concern which is licensed to manufacture them. This also applies to the Columbia. It had been generally supposed that the Columbia company also was a licensee but such is not the case. The Columbia was supposed to buy its engines from the Stoddard-Dayton, but this was not done, the Columbia making Knight engines at the Hartford plant.

This cancellation of the Stoddard-Dayton license leaves three concerns in this country with the right to make Knight motors—the F. B. Stearns Co., of Cleveland; the Lyons-Atlas company, of Indianapolis, and the makers of the Edwards-Knight.

GRABOWSKY PLANT FOR SALE

Detroit, Mich., Dec. 17—Lee E. Joslyn, referee in bankruptcy, has given notice to creditors of the Grabowsky Power Wagon Co., of Detroit, bankrupt, that property of the company will be sold by the Security Trust Co., of Detroit, trustee, which will receive sealed bids in its office in Detroit up to December 23. Each bidder is required to deposit a certified check, payable to the trust company, to the amount of 15 per cent of its bid, and each bidder may bid upon the whole or any separate parcel of the property, the deposit to be forfeited should the bidder, after being declared successful, refuse to carry out the provisions of the bids.

The inventory includes real estate to the amount of \$168,552.98, which is appraised at \$140,000. Other items are: Machinery, inventory, \$60,777.84; appraisal, \$42,456.68; equipment, \$10,255.10; appraisal, \$6,026.26; furniture and fixtures, inventory, \$6,809.73; appraisal, \$5,144.42; jigs and tools, inventory, \$19,517.04; appraisal, \$16,032.19; patterns, inventory, \$11,913.41; appraisal, \$5,848.31; material, inventory, \$122,023.30; appraisal, \$100,696.88; miscellaneous, inventory, \$448.01; appraisal, \$436.60. The inventory total is \$400,297.41, while the total of the appraisal is \$316,641.34.

Holders of Non-Poppet Motor Patents Cancels Manufacturing Rights

Fifteen per cent of the amount bid must be paid by December 25 and the balance as soon as the property is turned over. The Grabowsky Power Wagon Co. was adjudicated a bankrupt by Judge Tuttle in the United States district court in Detroit, November 23.

JANNEY R. C. H. GENERAL MANAGER

Detroit, Mich., Dec. 17—P. R. Janney, at present general manager of the Peninsular Motor Co., Saginaw, Mich., maker of the Marquette cars, will on January 1 become general manager of the R. C. H. Corporation, to succeed J. F. Hartz, who was chosen to direct the concern's affairs on November 8. Following the reorganization of the company, Mr. Hartz's resignation is ascribed to his inability to devote sufficient time to the R. C. H. affairs, owing to his other business interests which command much attention.

Mr. Janney had been associated with the General Motors for some time prior to the taking hold of the Marquette affairs, he having been engaged to wind up the Randolph Motor Car Co.'s business. Mr. Hartz retains the office of treasurer.

A hurried conference of R. C. H. branch managers from all parts of the country was held in this city today, the new management being made known to them. One of the objects of this conference was to take steps for the discontinuing of a number of branch houses and to replace them by dealers. This move should greatly decrease the corporation's operating expenses.

TO CONTINUE VAUGHAN CAR

New York, Dec. 17—The Vaughan Motor Car Co., capital \$1,000,000, has just been incorporated to take over the Woods Mfg. Co., of Kingston, N. Y., and to continue making the Vaughan car. It is tentatively proposed to make 500 cars in 1913. The new company will have \$300,000 of cumulative preferred stock and \$700,000 of common.

INTERNATIONAL REORGANIZING

New York, Dec. 18—Reorganization of the International Motor Co. will be along these lines: The holders of common stock are requested to deposit their certificates from which 55 per cent will be deducted. The financial syndicate, managed by Frederick W. Allen and Z. S. Freeman, representing large stock interests, have pledged themselves to furnish \$1,500,000 additional capital for the company.

All common stockholders are privileged to subscribe for parts of this loan. A

bonus of 200 per cent par value of common stock will be given to the lenders, giving them control of the property.

The company has had an active, prosperous year and its business has been 90 per cent greater than in the corresponding period of 1911. The company has delivered or is in process of manufacturing to fill orders, 1,143 trucks valued at \$4,439,703. The net earnings for the first 10 months of 1912 are \$335,000, or about double the dividend requirements. The difficulty lay in trying to stretch out working capital too thinly in the face of an inherited inventory of \$2,700,000 which came to the present company at the time of the merger, a considerable part of which was unliquidated.

The new interests will elect a majority of the board and Vice-president Dickerman, of the American Car and Foundry Co., has been engaged to make a detailed inspection of the property, which will occupy 4 months.

MILWAUKEE'S SHOW ROW SETTLED

Milwaukee, Wis., Dec. 17—After a week of turmoil, during which a new organization of motor car dealers was actually organized and articles of incorporation filed, an exposition hall leased for a second motor show to compete with the regular Milwaukee show, and several skirmishes in a warfare between two factions of dealers fought, it was announced on Monday that there will be but one motor show in Milwaukee for 1913, and it will be promoted with the united efforts of the entire motor car trade of the city.

A week ago today the Milwaukee Motor Show Association, organized by members of the Milwaukee Automobile Dealers' Association, and incorporated without capital stock, issued blanks for space in the 1913 Milwaukee show, to be given from January 11 to 17, inclusive in the Auditorium. The blanks were issued to all of the dealers in Milwaukee, about sixty in number, of which twenty-two are affiliated with the M. A. D. A. Tuesday night twenty-four of the dealers who are not affiliated, met and organized the Milwaukee Progressive Automobile Dealers' Association, the principal object of which was to conduct a motor show according to its own ideas of how a motor show ought to be run. A tentative lease was made with the management of the Hippodrome, an exposition palace of lesser proportions than the Auditorium, which, by the way, was the home of Milwaukee's first motor show, when the Milwaukee Automobile Club started the ball rolling in 1908. The tentative dates were January 11 to 17, inclusive, or the same period set for the regular show of the Milwaukee Motor Show Association.

It appears that the so-called progressive

Philadelphia's New Club House Opened

dealers were dissatisfied with the conditions made by the motor show society and determined to run their own show on a co-operative plan. The progressives claim that not only was the price per space increased \$50 over that charged at the 1912 show, but certain other conditions were imposed which made it advisable for them to get busy and run their own exposition.

As soon as the progressives announced their plans, the regular organization got busy and negotiated for a compromise, so that Milwaukee would not be called upon to support two shows at the same time, a condition which might result in either two failures or two successes. The conferences lasted over Sunday, and on Monday it was announced that a compromise had been effected and there would be but one grand and glorious exhibition, supported by the combined forces of the Milwaukee dealers, representing about eighty-five or ninety pleasure cars of various makes, to be shown in the Auditorium building, the whole to be presented to the curious gaze of the waiting public from Saturday evening, January 11, to Friday evening, January 17.

INDIANA DISCUSSES ROADS

Indianapolis, Ind., Dec. 16—The present Indiana road building and road maintenance system was condemned and a radically new system proposed, at the meeting of the Indiana Better Roads Convention held at the German house in this city, Wednesday, Thursday and Friday of last week. It is seldom that a more attractive program has been arranged, than that presented at the convention.

The convention was a congress of several hundred advocates of good roads from all parts of Indiana. In addition, some of the road building experts of the United States government were present, as were other good roads advocates of the country.

It was the unanimous opinion that the present haphazard method of road building is extravagant and wasteful, that the roads built have no degree of permanency and that the whole system is wrong.

The convention proposed that a state highway commission be formed and that a state fund be created by means of a special road tax and a vehicle tax for all motor vehicles and chauffeurs. In accordance with these recommendations, a bill has been drawn which will be introduced in the legislature next month, which recommends taxing by horsepower.

PRIZE FOR NEW FUEL

London, Dec. 7—The Society of Motor Manufacturers and Traders has offered a prize of \$10,000 for a home-produced motor fuel at a commercial price and obtainable in sufficient quantities to make it possible for motoring use.

Quaker Motorists Take Possession of Handsome Quarters

PHILADELPHIA, Pa., Dec. 14—With ceremonies appropriate to the occasion, the formal opening of the new club house and garage of the Automobile Club of Philadelphia on Twenty-third street, between Market and Chestnut streets, took place today. At the same time the announcement was made that the proposition submitted to members to lease the mammoth building to the Philadelphia Automobile Trade Association from January 15 to February 5 for the purpose of holding the annual show there, had been approved. The show will extend over 2 weeks, from January 18 to February 1.

Powell Evans, president of the Automobile Club of Philadelphia, officiated and made the dedication address at the laying of the cornerstone in the Ludlow street corner of the structure. Mr. Evans, in a brief talk, reviewed the object and aims of the organization and what it hopes to accomplish, with the co-operation of the members, in the working out of legislative problems of interest to the motorist and public alike and in the development of good roads. Open house was the order of the day and all afternoon members and friends inspected the new quarters.

The Automobile Club of Philadelphia's building formally dedicated this afternoon represents the growth of an agitation inaugurated years ago for the ownership of a building containing a garage for the use of members. The building is a handsome fireproof concrete and steel structure occupying a lot containing $\frac{3}{4}$ acre. The entire front, extending 237 feet along Twenty-third street south of Market, is wired glass, inclosed in steel framework, giving the interior of the building perfect natural light during the day. The lot has a depth of 140 feet. The location is an ideal one, being on the traveled line to the business section of the city, Broad street and Fairmount park, and is readily accessible to all the outlying districts.

As at present constructed, the building is three stories in height, each floor containing 30,000 square feet of space. Ultimately it will be six stories high, with an estimated capacity for storing 750 cars. The structure contains every modern convenience and necessity. In addition to spacious club rooms, offices and board of directors' quarters, there also are perfectly appointed chauffeurs' quarters provided with lounging rooms, bath and wash rooms; repair and machine shop, etc. The club operates a touring information bureau, law and ordinance bureau, a co-operative supply bureau and issues a monthly bul-

letin and yearly route book. The club is 12 years old and has grown from an initial membership of sixteen, occupying a room on the top floor of the Manufacturers' Club, to a present membership of 1,600, the largest in Pennsylvania and one of the largest in the country. Powell Evans, as chairman of the finance and construction committee, was most active in carrying the plans to completion.

HEMERY SMASHES RECORDS

London, Dec. 7—Hemery in one of the Lorraine-Dietrichs which was built for the last French grand prix, which has a four-cylinder $6\frac{1}{2}$ by 8-inch motor, succeeded November 27 on the Brooklands speedway in smashing all world's records from 1 to 6 hours, inclusive, and from 100 to 500 miles, with the exception of the 300-mile mark. In the run Hemery made five stops in all, aggregating about 45 minutes, one being 23 minutes in duration for the purpose of replacing broken spring bolts. He had no motor trouble whatsoever. The following table shows the new records and the old:

| BY MILES | | | | |
|----------|------------|----------|------------|--|
| Distance | New Record | M. P. H. | Old Record | |
| 100 | 1:01:27.69 | 67.62 | 1:04:51.16 | |
| 150 | 1:31:52.06 | 97.97 | 1:44:30.16 | |
| 200 | 2:05:58.73 | 95.51 | 2:17:56.36 | |
| 400 | 4:34:23.87 | 87.46 | 5:05:53.36 | |
| 500 | 5:48:38.87 | 86.05 | 6:40:16.45 | |

The Sunbeam formerly held the 100, 400 and 500-mile records; the others belonged to the Thameses.

| BY HOURS | | | | |
|----------|------------|----------|------------|-----|
| Hour | New Record | M. P. H. | Old Record | |
| 1 | 97 | 1,037 | 92 | 797 |
| 2 | 189 | 1,747 | 94.99 | 173 |
| 3 | 284 | 817 | 94.82 | 261 |
| 4 | 344 | 1,344 | 86.19 | 319 |
| 5 | 422 | 1,574 | 84.59 | 391 |
| 6 | 518 | 312 | 86.36 | 451 |

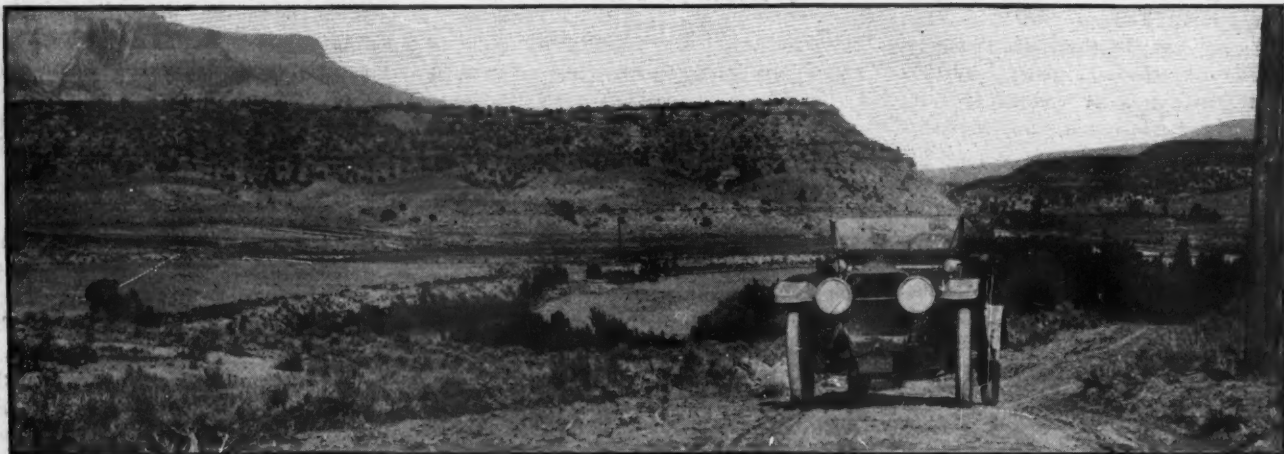
The Sunbeam held the 1, 4, 5 and 6-hour records and the Thameses the 2 and 3-hour.

INDIANA ASSOCIATION FORMED

Indianapolis, Ind., Dec. 17—The Indiana State Automobile Association has been formed by representatives of the various motoring clubs of the state. Clubs which have a charter membership in the state organization are the Hoosier Motor Club of this city; Salem Automobile Club, Salem; Madison Auto Club, Madison; Terre Haute Auto Club, Terre Haute; Winchester Auto Club, Terre Haute, and Evansville Auto Club, Evansville.

Officers of the organization are: President, P. C. Rubush, an Indianapolis architect and vice-president of the Hoosier club; second vice-president, Samuel Lane, president of Terre Haute Club; first vice-president, W. A. Koch, president Evansville club; secretary-treasurer, W. S. Gilbreath, secretary Hoosier Club. The state club will be affiliated with the A. A. A. A. G. Batchelder, chairman of the executive committee of the A. A. A., addressed the meeting at which the club was formed.

1000 Miles through Colorado



MESA COUNTRY ALONG THE GRAND RIVER BETWEEN GRAND VALLEY AND DEBEQUE



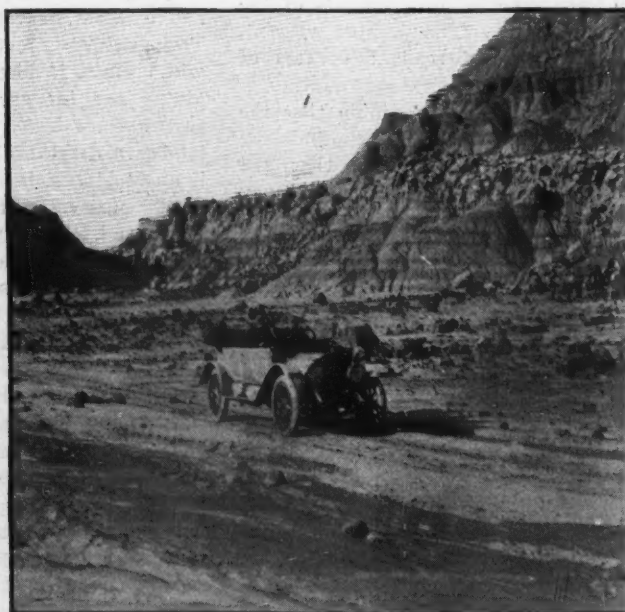
TYPICAL ROAD THROUGH THE MESA COUNTRY

THE MESA COUNTRY

NO one can cross the continental divide in Colorado without being impressed with the essential difference in topography between the Atlantic and Pacific slope. In crossing westward over the Tennessee pass the rock formation changes almost immediately to one resembling the Arizona-New Mexico country with the multi-colored sand, clay and rocky cliffs. To be sure, the colors are not quite so brilliant as in some southern states, but none the less they are picturesque and most interesting.



BRIDGES ARE WOODEN AND SUBSTANTIAL.



MULTI-COLORED SAND, CLAY AND ROCK CLIFFS



NEARING SUMMIT OF PASS WITH MT. MASSIVE AND MT. ELBERT IN BACKGROUND

Over Tennessee Pass



GRADUAL ASCENT ABOVE LEADVILLE TO TOP OF PASS



LOOKING NORTHWESTWARD COMING DOWN WESTERN SLOPE

TENNESSEE PASS

IN crossing the continental divide between Leadville and Glenwood Springs the motor tourist crosses from the Atlantic to the Pacific slope over Tennessee pass, one of the lowest and most accessible roads over the Rockies, with an alti-



COMING DOWN PACIFIC SLOPE OF TENNESSEE PASS

tude of 10,276 feet. Although very heavy snowfalls may take place and block the pass to travel as early as September, this same snow very seldom stays more than a day or two until late October or November. Although the crossing here is at an altitude of nearly 2 miles, approaching the pass from Leadville one hardly notices the climb, as it is a gradual ascent of about

2,300 feet from Buena Vista. Members of the recent pathfinding trip who went through the pass found it to be one of the most interesting features of their most enjoyable trip through Colorado. The rugged scenery appealed to them strongly, while the roads were excellent.



Routes and

Winter Attractions of Southern Florida and Improved

By Edwin D. Lambert

TAMPA, Fla., Dec. 14—With the rapid influx of new settlers and the increasing number of tourists who come to Florida every winter, the people of this state naturally have turned their attention, particularly in recent years, to the improvement of the public highways. This is especially the case in south Florida, which, by reason of climatic and other superiority from the tourists' point of view, draws the greater majority of these visitors.

The motor tourist has become so numerous and inquiries as to the facilities for motoring so incessant that the counties of south Florida have become aroused to the necessity of extensive and permanent improvement along this line. Hence it is that there has been more road-building in this section in the past 2 years than in all previous years.

The winter tourist who brings his motor car as an indispensable adjunct to his pleasuring insists that there be well-paved roads and that these roads lead through pleasant scenes and reach convenient and interesting objective points. They must be so arranged as to afford reasonably short runs, suitable for a day's outing. It is to meet the desires of these visitors as well as of the home people that the road-building authorities of south Florida counties have planned their highways.

Noticeable Road Improvements

While there is a great deal yet to be done, wonderful improvements have already been accomplished and the tourist who has been a regular visitor to south Florida is agreeably surprised to note the progress made from season to season.

No section of the country lends itself more admirably to the purposes of motor touring than south Florida, which, from the higher lands of the mid-peninsula to the grassy borders of the Everglades, fairly teems with beautiful retreats and attractive reaches, dotted with clear lakes and watered by palm-bordered rivers. The semi-tropic growth, interrupted by frequent farms and fruit groves, is a scenic luxury afforded in no other part of the country.

Throughout this region the outposts of industry have begun to place and establish thriving communities, lively little towns set in pines, palms, live oaks or orange groves, which are catching step with progress and development and reaching rapidly toward cityhood with every energy that enterprising citizenship affords. The colony idea has found substan-

tial foothold here, too, and companies of 100 or more northerners, acquiring a desirable site, proceed to build modest homes and develop the possibilities of the fertile soil, establishing for themselves a habitation and a means of livelihood where conditions are most favorable and surroundings most auspicious.

Winter Climatic Conditions

It is scarcely necessary here to speak of the winter climate of south Florida, which has been so often shown superior to that of all other sections competing for tourist preference. It is sufficient to say that, with an average temperature rang-

parted by a glance at the calendar.

If it be the desire of the winter motorist to drive every day, to be unhindered by chilly blasts or incessant rains, with all the natural charm of congenial scenery and opportunities for outdoor sports, fishing, hunting, bathing, golf, picnics in idyllic spots or camp-out parties with all their healthful pleasure, south Florida is the section best suited to his needs.

Tampa, the metropolis of south Florida, a city of more than 50,000 population, with a record of increasing 143 per cent from census to census, affords all the conveniences, facilities, comforts and luxuries of the modern city and besides has many



DRIVING THROUGH STATELY PINES AND SPREADING OAKS, WHERE HIGHWAY PASSES GROVES OF ORANGES AND GRAPE FRUIT

ing between 50 and 70 and with a minimum of rainfall, there is scarcely a day in a month when outdoor recreation is not possible. Nowhere else does the tourist realize the privilege of motoring day after day without the interference of inclement weather. The cold spells when they do come are not of sufficient intensity or duration to interrupt the pleasure of the tourist. Instead of barren, snow-covered landscapes and frozen streams, the visitor to south Florida always finds verdant vegetation, green lawns and fruit-laden trees, with streams, lakes and bays rippling in the sunshine, the waters warm enough for agreeable bathing—all this at Christmas as in the spring or the summer, with no sensations of winter save that im-

points of exceptional interest for the instruction and entertainment of the visitor.

Industries in Tampa

Here is the Tampa Bay hotel, built by the late Henry Bradley Plant at a cost of more than \$3,000,000, now owned by the municipality and operated as a high-class tourist hotel, with its superb botanical gardens, open as a park to the public; the great clear Havana cigar industry, employing 15,000 operatives, with nearly 200 large factories where the Cuban leaf is rolled into the finest grade cigars to the number of 300,000,000 a year. These factories always are objects of interest to visitors, and the process of making the cigars affords something new to the traveler, as well as the manner of life of the

Touring Information

Highways Offer Inducements for Motorists to Tour

Spanish, Cuban and Italian workmen, who have their separate communities and colonies, miniature reproductions of Madrid or Havana, saving the cost and trouble of a trip to Cuba.

Tampa also is the center of the big fishery industry and of the phosphate mining district, and the recent improvement of the harbor has made it an important shipping point. The nearest port with railroad facilities to the Panama canal, the city anticipates marked benefits when the inter-oceanic waterway is completed. The city itself has more than 60 miles of vitrified brick streets and has just issued bonds for \$1,700,000 for additional paving and other public improvements. Accom-

the south, in proportion to population, in good roads mileage.

Fashionable Driveway of Tampa

The Bayshore boulevard, which is the fashionable drive of Tampa, extends from the city along the shore of Hillsborough bay to Ballast Point, 6 miles, where there is a recreation park, piers, a pavilion and the attractive clubhouse and fishing and bathing piers of the Tampa Yacht and Country Club. The boulevard proceeds thence 5 miles to Port Tampa, where are extensive railroad terminals and which is of historic interest from the fact that it was the point of embarkation for the Shafter army in the Spanish-American war. This drive is most fancied by mo-



groves and grapefruit groves and past handsome suburban homes.

One of the most popular trips is over a paved road which leads westward to what is known as the west coast or sub-peninsula, recently embodied into a new county, Pinellas. This road extends through a beautiful country and branches in three directions. One reaches Espiritu Santo Springs, a summer and winter resort, famous for its medicinal waters. The northern branch leads through Sutherland, seat of a large Methodist college, to Tarpon Springs, one of the rapidly growing towns of this state, where is conducted the sponge industry, the sponges being obtained by deep-sea divers, all Greeks, who are adept at the trade.

Here the visitor will have opportunity to study still another nationality, living as on their native soil, the cafes, theaters and churches presenting a novel phase of how the other half lives. There are 3,000 of these Greeks at Tarpon Springs.

Trip to St. Petersburg

The southern branch of the road reaches Clearwater, one of the prettiest towns to be found anywhere, built on high bluffs overlooking the bay and the chain of small keys which protect the inland harbor from the open gulf. St. Petersburg, a resort city, situated near the tip of the sub-peninsula, is the end of this tour and here one will find a model town, showing many evidences of progress and prosperity and unexcelled for fishing. Five thousand visitors and winter residents fill St. Petersburg every season. At this point, one may house his car for a few hours and take boat to Pass-a-Grille, an island facing the open Gulf of Mexico, where, throughout the winter, seashore pleasures are enjoyed, not possible at other sea-coast resorts save in summer.

Just out of Clearwater the car takes a broad avenue through the grounds of the magnificent Bellevue hotel, another of the former Plant chain of hotels, now owned by Morton Plant, a winter hotel where hundreds of tourists spend the season and which affords not only the other pleasures of a Florida winter but one of the finest golf courses in the country. All along this route are the elegant winter homes of men of wealth and high position, who find here attractions equal to those of the Riviera and with the advantage of greater accessibility and convenience. This entire trip can easily be made in a day with ample time for stops at each point.



SOUTH FLORIDA MOTORIST FINDS SCENIC DELIGHTS OF SEMI-TROPIC LUXURIANCE NOT EQUALED ELSEWHERE IN COUNTRY

modations for winter visitors are ample and in any style desired, and at reasonable rates.

Headquarters for Short Tours

The motorist who makes his headquarters at Tampa will find it a most desirable point from which to make his tours or short trips. Reaching out from Tampa as a center are more than 300 miles of hard-surfaced roads, touching every point of interest in the south Florida section and affording trips of a day, a few hours, or a week, as may be desired.

Eight hundred motor cars are owned in Tampa, which is itself an indication of the favorable conditions for motoring. Hillsborough county, of which Tampa is the county seat, leads all the counties of

tourists who desire to make only a short run.

Another attractive drive is known as the loop, which encircles the country north of the city, passing out from the brick-paved streets of the city through West Tampa, a separate but adjoining municipality, built up by the cigar industry, and touching Sulphur Springs, 6 miles north of the city, one of the natural wonders of the state—a spring flowing 30,000 gallons a minute and providing a pool where the best sulphur bathing may be enjoyed. Here there is an inn and other places of entertainment and a distinct mineral spring, the waters of which have been competently pronounced of the finest medicinal quality. The loop leads the motorist back to the city through bearing orange

Another paved-road runs southwardly from Tampa past Riverview, on the Alafia, a pretty country town, to the far-famed Manatee county section, where orange and grapefruit growing are at their best. Bradentown and Palmetto, towns on opposite sides of the Manatee river, crossed by substantial bridge, will interest the tourist and, proceeding farther south, he reaches Sarasota, the center of a very extensive development now being carried on by Mrs. Potter Palmer, of Chicago, who has bought large tracts of land in the vicinity.

Sarasota is a noted fishing and bathing resort and is crowded every winter with visitors. It has a good hotel and all facilities for the accommodation of tourists. In De Soto and Lee counties, still farther south, there are many points of interest. Arcadia and Punta Gorda, in the former, and Fort Myers, in the latter county, are popular places of resort. Punta Gorda is on the famous Charlotte harbor, while Fort Myers, at the mouth of the Caloosahatchee, is the most southern town on the gulf coast of Florida, known as the gateway to the Everglades, now being reclaimed for settlement.

The surroundings are semi-tropical and all along the coast are fine homes, where wealthy northerners disport in the winter season. One of these is the property of Thomas A. Edison, and it is one of the show places of the section. Near Fort Myers is Estero, the home of the Koreshan Unity, a peculiar sect founded by the late Dr. Cyrus Teed, of Chicago, who maintained that we live on the inside of the globe. When Dr. Teed died, his followers declared he would return to earth in another form and they still are awaiting this event. They have, despite their queer beliefs, a thriving community, with many diversified industries. This entire trip, if one desires to visit each place of interest, should occupy a week or 10 days.

Leading westward from Tampa, the motorist finds a good road to Plant City, Lakeland, Bartow and to Winter Haven, where the plantation home, Florence villa, is located, through the beautiful lake region. With but few breaks, this route and on to Jacksonville. A road northward will take the tourist through Pasco and Hernando counties and thence to Ocala and another route to Jacksonville.



ON A SOUTH FLORIDA PAVED ROAD. A STOP UNDER A GREAT OAK

From Tampa passenger steamers run thrice weekly to Havana, and this affords an excellent side trip, either with or without one's car. If the car is taken the pleasure of the good roads of Cuba may be enjoyed to the heart's content.

Hillsborough county, of which Tampa is the county seat, is talking of a million-dollar bond issue to build vitrified brick roads exclusively. Every county in this section, without an exception, has recently floated bonds for good roads and the work is in progress continuously. In Hillsborough, 2 years ago, owing to the agitation for better roads, the convict lease system, which hired out the convicts to private enterprises, was abolished, and all the county prisoners have since that time been worked on the public roads with excellent results.

The sentiment for permanent brick roads is so strong that it is likely all the new roads in this county will be of this material.

Endurance tours are arranged at intervals by local authorities in the motor world and several very successful ones have been had from Tampa to Jacksonville, Tampa to St. Petersburg and Tampa to Sarasota. The

Tampa Automobile Association has procured extensive land near the city and has built a modern clubhouse, which will have golf links in connection.

To show the interest felt in better highways in Florida, it may be mentioned that a movement is now on foot to have the next session of the legislature, which meets in April, authorize a state bond issue of \$50,000,000, to be devoted to the building of vitrified brick highways throughout the state. Senator Fred. L. Stringer, of Brooksville, fathered this measure, and it is believed that it will be readily adopted.

The plan calls for three great state highways, Jacksonville to Miami, Jacksonville to Tampa and Jacksonville to Pensacola, with laterals connecting every county seat in the state with these highways. The counties are to maintain the roads within their limits, but the whole project will be under the direction and control of a state highway commission. The plan is now being explained and advocated by many of the papers of the state and is meeting with much favor. With such a system of roads Florida will become a mecca for motorists from all sections and

its numerous attractions, especially its fine climate, will make it the winter rendezvous of thousands.

Tampa's Spanish Dinners

The motor tourist who desires a congenial location with admirable opportunities for daily tours of appealing interest and charm will find Tampa in every way suited to his requirements. From this city may be reached all the points of attraction in this section and he may spend many weeks without exhausting the manifold beauties of this "Land of Perpetual Spring."

I cannot close this article without mentioning the incomparable delight of one of Tampa's famous Spanish dinners, served in the real Castilian style and in which the motorist, after an inspiring spin through avenues of citrus trees and along the shore of the placid bay, may find added pleasure in discussing the toothsome merits of pollo catalana, or pollo y arroz, or the steaming satisfaction of the tortilla au rum. Thus a day of exhilarating driving may be crowned with a gastronomic triumph possible only in the animated cafes of Ybor City.

Answers to Readers of Motor Age Regarding Routes

GOING TO PACIFIC COAST

KENOSHA, WIS.—Editor Motor Age—I would like a good route to Portland, Ore., by way of Omaha, Denver, Los Angeles, San Francisco and Seattle. I don't want to go through Des Moines on account of the sand.—C. J. Rickard.

Leave Kenosha for Truesdell, then head south for Chicago on the inside road through Everitt, Deerfield, Northfield, Grosse Point, Wilmette, Evanston, and follow Sheridan road into Chicago.

Chicago to Burlington, Ia., is 241 miles and is practically all gravel or stone roads through Forest Park, Proviso, Fullersburg, Hinsdale, Downers Grove, Naperville, Aurora, Montgomery, Bristol, Plano, Sandwich, Somonauk, Earlville, Triumph, Mendota, Dover, Princeton, Wyand, Sheffield, Neponset, Kewanee, Galva, Wataga, Galesburg, Coldbrook, Monmouth, Oquawka, and Burlington.

The Blue Grass trail extends across Iowa to Omaha, and this can be followed first to Creston, 194 miles, through Middletown, New London, Mt. Pleasant, Rome, Lockridge, Glendale, Fairfield, Batavia, Agency, Ottumwa, Blakesburg, Albia, Georgetown, Melrose, Russell, Chariton, Woodburn, Osceola, Murray, Tadmage, and Afton. The balance of this road lies through Kent, Corning, Brooks, Nodaway, Villisca, Red Oak, Emerson, Hastings, Malvern, Glenwood, Council Bluffs, and Omaha, 111 miles.

A section of the Omaha-Denver transcontinental route, which is in excellent condition, is traversed to Millard, Gretna, Ashland, Waverly, Havelock, Lincoln, Emerald, Milford, Friend, Exeter and Fairmont, where the Meridian road is intersected. This road extends north and south from Winnipeg, Canada, to Galveston, Texas, and you will follow it to Newton, Kans. Turn south on this highway through Brunning, Belvidere, Hebron, Chester, Belleville, Concordia, Minneapolis, Salina, Bridgeport, Lindsborg, McPherson, Moundridge, Heston, and Truesdale.

The Santa Fe trail is now taken up, going west on it as far as Dodge City through Halstead, Burrton, Hutchinson, Nickerson, Sterling, Lyons, Chase, Ellinwood, Great Bend, Kinsley, Taft, Olerie, Spearville, Wright, Dodge City.

A route quite the best to be found running to El Paso is through the following towns: Reinert, Fowler, Plains, Springfield, Edmund, Liberal; in Oklahoma go through Tyrone, Hooker, Guyton, Goodwell, Texhoma; in Texas the routing is Stratford, Ruby, Dumas, Amarillo, Canyon, Happy, Tulla, Kress, Plainview, Hale Center, Abernathy, Lubbock, Brownfield, Gomez, Plains, Bronco; then New Mexico with some bad roads in several places going through Roswell, Picacho, Hondo, Ruidoso, Mesalero, Tularosa, Alamogordo and entering El Paso through Fort Bliss. Dodge City to El Paso is about 1,390 miles.

Going west across New Mexico the towns are Anthony, Mesquite, Afton, Aden, Cambridge, Deming, Lordsburg, Rodea; and Douglas, Lowell, Hereford, Huachuca, Vall, Tucson, Red Rock, Florence, Mesa, Phoenix, Liberty, Castle Dome, Gila City, Yuma, in Arizona.

Crossing the Colorado river into California you proceed to Ogilby, Drylyn, Glamis, Mammoth, Brawley, Imperial, El Centro, El Campo, Potrero, Dulzura, Jamul, San Diego, which is 433 miles from Phoenix.

Los Angeles is 136 miles from San Diego and, except along the shore where new roads have been constructed and some sandy stretches abound, good dirt or macadam roads prevail.

The towns are La Jolla, Del Mar, Encinitas, Merle, La Costa, Oceanside, Stuart, Las Flores, San Luis Capistrano, Irvine, Tustin, Santa Ana, Anaheim, Fullerton, La Habra, Bethel, Whittier, Montebello and Los Angeles. One hundred and six miles through Hollywood, Calabasas, Newberry park, Camarillo, El Rio, Montalvo, Ventura, Carpinteria and Summerland take you into Santa Barbara. The stretch

to Paso Robles is by way of Goleta, Naples, Orella, Los Cruces, Los Olivos, Sisquoc, Garly, Santa Maria, Nipomo, Arroyo Grande, Edna, San Luis Obispo, Monterey, Santa Margarita, Templeton, Paso Robles, 151 miles.

It is 213 miles between Paso Robles and Frisco passing through San Miguel, Bradley, Jolon, Greenfield, Soledad, Gonzales, Salinas, San Juan, Gilroy, Madrone, Coyote, San Jose, Malpitas, Irvington, Alvarado, Mt. Eden, San Lorenzo, San Leandro, Fruitvale, and Oakland. A good road into San Francisco from San Jose is Santa Clara, Mayfield, Redwood, Belmont, San Mateo, Millbrae, Bolcoff, South San Francisco and Colma.

This route along the coast from San Diego has been over the Pacific highway, and it is still followed to Seattle through Oakland, Stockton, Sacramento, Roseville, Lincoln, Sheridan, Wheatland, Marysville, Oroville, Chico, Red Bluff, Redding, Pitt River Ferry, Baird Hatchery, Dunsmuir, Sisson, Edgewood, Montague, Coles, Ashland, Medford, Grants Pass, Glendale, Roseburg, Oakland, Drain, Eugene, Salem, Oregon City, Portland, Vancouver (Wash.), Lewis River, Kelso, Castle Rock, Chehalis, Centralia, Roy, Tacoma, Kent, Seattle.

DECEMBER TRIP THROUGH IOWA

Rice, Kans.—Editor Motor Age—I wish to make a trip from Concordia, Kans., to Chicago by way of Newton, Ia., in my motor cycle. What is the best route and how many miles is it from town to town? Would it be safe to take such a trip this time of year? Will I be required to take out a license?—C. L. Krummel.

It would be impossible on account of lack of space to give the mileage between towns. This can be found in the Blue Book No. 5, which covers the road with running directions. Fill an empty syrup can with gasoline and strap it on in front for your supply in the tank will only last from 70 to 100 miles. It

is 85 miles to Beatrice through Belleville, Chester, Hebron, and Fairbury, then 39 to Lincoln through Pickerell, Cortland, Princeton.

Lincoln to Omaha first over macadam for 10 miles then dirt the rest of the way lies through Havelock, Waverly, Ashland, Gretna, Millard. Leave Council Bluffs over the River-to-River road going through Weston, Underwood, Neola, Minden, Avoca, Walnut and Marne to Atlantic, 64 miles; branch off on the White Pole road through Wyota, Anita, Adair, Caset, Menlo, Stuart, Dexter to Redfield, 55 miles, and back on the River-to-River for 35 miles going through Adell, Ontarioville, Waukee, Des Moines. Newton is then 37 miles distant through Altoona, Mitchellville, Colfax; and Marshalltown, on the Iowa transcontinental is 32 miles north.

Following the Iowa transcontinental east to Clinton the mileage is divided as follows: To Cedar Rapids, 76 miles, the routing is Montour, Tama, Belle Plaine; then to Clinton, 90 miles, the routing is Marion, Mt. Vernon, Mechanicsville, Clarence, Lowden, Wheatland, Grand Mound, DeWitt. Rochelle, Ill., is 69 miles from Clinton and reached through Lyons, Fulton, Union Grove, Morrison, Sterling, Dixon, Franklin Grove, Ashton; then continue to Creston, De Kalb, Geneva, Lombard, Elmhurst, Maywood, and you reach Chicago with 78 miles travel.

You ought not to have any difficulty in making the trip right now, and you need not bother about taking out any other state license.

OVER SOUTHERN ROUTE

Golden City, Mo.—Editor Motor Age—I am going to make a trip to El Paso some time in December and would like a road map and route by way of Dallas, Tex. I intend to take a complete camping outfit.—Reader.

From Boston your best route lies through Jasper, Carthage, Neosho, Pineville, Hiawassa, Centerton, Bentonville, Rogers, Lowell, Springdale, Johnson, and Fayetteville, 122 miles. To Carthage the road is part oiled and part macadam, but from Neosho to Fayetteville, about 84 miles, you have a variety of macadam and dirt and through some flint hill country, but there are no bad grades or bad streams. Enroute for Winslow you cross the Boston mountains and the only grade of any note. At Vanburen cross the river on a fine bridge and go into Fort Smith, being 62 miles from Fayetteville. The Fort Smith-Little Rock section of the journey is through Charleston, Paris, Dardanelle; cross the Arkansas river to Russellville, Pottsville, Atkins, Morrelton, Plumerville, Wooster, Conway, Palarm, and Little Rock. Plumerville to Conway by way of Wooster is a distance of 10 miles out of the way, but this has been done to avoid the Caddo bottoms, which, it is understood, are impassable about two-thirds of the year.

Little Rock to El Paso, Tex., can be followed in the Blue Book No. 5. To Texarkana it is 192 miles and mostly good gravel road through Collegeville, Benton, Fairplay, Lonesdale, Hot Springs, Lawrence, Social Hill, Friendship, Arkadelphia, Dobyville, Okolona, Boughton, Prescott, Emmet, Hope, Fulton and Homan. Then to Dallas, 217 miles, a good road is through Leary, Hooks, Boston, De Kalb, Annona, Clarksville, Detroit, Blossom, Paris, Brookston, Hightown, Petty, Honey Grove, Windom, Dodd City, Bonham, Whitewright, Pilot Grove, Sedalia, Anna, Melissa, McKinney, Plano and Dallas.

Through Texas from Dallas to El Paso your routing is Grand Prairie, Arlington, Handley, Ft. Worth, Ben Brook, Aledo, Annetta, Weatherford, Mineral Wells, Palo Pinto, Breckenridge, Albany, Hamby, Abilene, Tye, Merkel, Trent, Sweetwater, Roscoe, Loraine, Colorado, Westbrook, Iatan, Coahoma, Big Spring, Stanton, Midland, Warfield, Oressa, Grand Falls, Ft. Stockton, Marathon, Alpine, Marfa, Aragon, Valentine, Wendell, Chispa, Lobo, Dalberg, Torbert, Grayton, Sierra Blanca, Etholen, Lasca, Finley, Ft. Hancock, Fabens, and El Paso.



TYPICAL SOUTH FLORIDA ROAD, GROWING CROP ON ONE HAND AND WINTER HOMES ON THE OTHER

Remedy for Common Evil

Ohioan Tells How Small Boys Who Bother Truck Drivers May Be Foiled

LIMA, O.—Editor Motor Age—One of the hardest things for a truck driver to overcome is the practice of the small boy and often of the larger ones, of hanging on the rear or running along the sides of the machine. The boys are not only in danger themselves, but often by their noise or dangerous position so attract the attention of the driver that he has often made fatal and disastrous mistakes just at the time when he should have been most cautious and careful. But the remedy, and a very effective one, has been found, and if more truck drivers equipped their trucks with the following described apparatus, Fig 3, there would be a considerable decrease in the number of accidents to motor trucks.

This method consists in charging the metal parts of the truck from an induction coil so that when the boy touches it he will receive a shock of sufficient force to make him let loose instantly and it will also teach him to be careful of what he touches thereafter.

In order that more drivers may take



tery terminals to the main frame of the car.

Then when the push button is pressed, all the metal on the car is charged and anyone coming in contact with it will be shocked just enough to make him understand that a truck is private property and not to be trespassed upon. No more than four dry cells should be used, as any more would make the shock too severe.

The writer can vouch for the effectiveness of this system as he has used one similar to it for the last 6 months with the greatest of success, and what is of more consequence, other drivers inform me that they are having less trouble than formerly as it seems to create a respect for trucks in the mind of the small boy. —Fred. Lause.

ON CAMBERED REAR AXLES

Steubenville, O.—Editor Motor Age—In Motor Age issue November 7 is a reproduction of the DeDion Bouton. I do not quite understand the way in which the driving axles are constructed and the man-

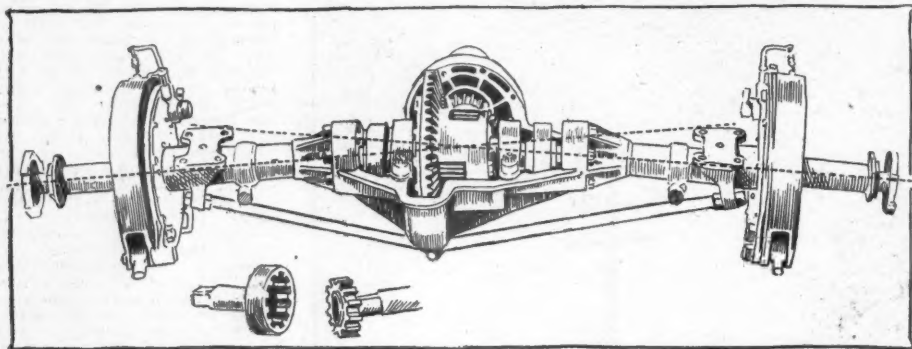


FIG. 1—PEERLESS CAMBERED AXLE—SLIGHTLY EXAGGERATED

advantage of this, I will describe an economical method of installing the necessary apparatus. Secure from a garage a second-hand single unit vibrator coil—these can usually be purchased for a small sum as they are out of date—even if it only gives a $\frac{1}{4}$ -inch spark on four dry cells it will be strong enough. Then cover the tail board or that part of the truck which the boys catch hold of with sheet metal in order to make a conductor of it.

Then mount your coil on dash or back of seat and connect the secondary or high-tension terminal to the sheet metal on the rear of the truck with a well insulated wire, keeping it well away from the metal frame, after which connect four dry cells in series to the primary or battery terminals of the coil and in this primary circuit place a push button switch so connected that when the button is pushed the circuit will be closed. This button may be mounted on the steering wheel or in any other convenient place. A ground wire should be run from one of the bat-

ner in which the rear wheels are kept in line. From the illustration it appears as though there would necessarily be a universal joint on each side of the differential. Could Motor Age give a view of the car from the rear, or further explain the one referred to? Also kindly state how the Peerless people camber the rear wheels? How do they line up the axles?—A Reader.

The DeDion Bouton rear axle proper is a light tubular dead axle, which carries two bearings for the transverse cardan shafts that act as driving members. The worm-driven differential is secured in its housing to the frame at the rear of the car. The transverse drive-shafts run from the housing to the bearings on the rear axle, and are fitted with two inclosed telescopic universal joints each. A universal is fitted to the main drive-shaft between the differential and the gearset, but it has but little movement, being provided as a measure against strains being applied to the shaft by the distortion of

The Readers

EDITOR'S NOTE—In this department Motor Age answers free of charge questions regarding motor problems and invites the discussion of pertinent subjects. Correspondence is solicited from subscribers and others. All communications must be properly signed, and should the writer not wish his name to appear he may adopt a nom de plume.

the frame. This axle is shown in a rear view in Fig. 2.

The Peerless rear axle resembles the DeDion in that it also employs universal joints, but differs in that the differential is housed by the axle, and is driven by the usual flexible shaft. The drive is taken to the differential in the usual manner, but instead of the two drive-axles extending across on a horizontal center they are slightly dropped at their outer ends, the drive from the differential being through universal joints. This is for the purpose of cambering the rear wheels, permitting them to be dished and thereby gaining strength. Unlike the DeDion universals, those used in the Peerless rear axle have a very restricted movement, and are but two in number, and hence may be made of a very efficient type. This is illustrated in the figure. The drive-axles of the Peerless rear axle are not lined up, but enter the differential at an angle, which is corrected by the universal joints.

EXHAUST VALVE OPENS EARLY

Joliet, Mont.—Editor Motor Age—What causes a motor to have one cylinder slightly louder than the other three? The motor runs well except in this regard and seems to be slightly lame when pulling heavy at slow motor speed, enough to cause quite a little vibration at times. When the motor is running one can notice that one of the exhausts is slightly louder than the balance and of a sharper sound. This is doing no damage other than that it is annoying. It is a $4\frac{1}{4}$ by $4\frac{1}{2}$ -inch motor of the valve-in-the-head type. The compression is good in all cylinders and the valves are all right. The exhaust has always been this way. I have not timed the valves with the flywheel, as it has never been changed and the camshaft is integral with the cams. I am of the impression that the camshaft is at fault as it appears that one valve is slightly out of time.

2—I would like the names of carbureters without springs, using a valve or weight to perform the same purpose; also a carbureter without a spray nozzle. I have one of this construction called the Gould, the manufacture of which has been discontinued because of patent infringements. I would like to get something similar.—W. D. Parsons.

1—It is evident that the exhaust valve

Clearing House

EDITOR'S NOTE—To the readers of the Clearing House columns: Motor Age insists on having bona fide signatures to all communications published in this department, not necessarily for publication but as an evidence of good faith. Motor Age will not publish communications where this rule is not lived up to.

of this cylinder opens earlier than the rest, so that the gas is allowed to escape when it is at higher pressure than the others. This may be caused, as you suspect, by faulty cutting of the cams, but the likelihood is very small, as integral camshafts seldom vary, being cut on automatic or semi-automatic machines and to conform to jigs and to pass inspections within very narrow limits. It is more likely that the length of the valve rods is at fault. If these are of the adjustable type, shorten up on the offending rod slightly. This will give a little more play than was had formerly, with the result that the valve will open a little later. It is possible also that the other valves have too much play in their action, so that they open too late. This would mean that the cylinder that sounded the loudest was the only one whose valves were working properly. Which of these is the case may be determined by running the motor on this cylinder alone, suddenly switching to another, and running that one alone. If the motor runs faster on the second, the other three are at fault. If it runs faster on the second, the fault is with the first cylinder. There can be little harm in such a condition, except as to cam wear. It is likely that the wear is more severe where the play is not so great.

2—The air-friction carbureter is without a nozzle, while the A. B. C., Newcomb, Stewart, Zenith, Excelsior, G & T, Miller and White & Poppe are without springs.

DELCO DATA

White Hall, Ill.—Editor Motor Age—I desire some information on the Delco lighting and starting system used on the 1913 Hudson cars. Does the Oldsmobile use the same as the Hudson?

2—Did the Cadillac use the same last year as the Hudson is using this year?

3—What other makes are using the Delco system this year, or will use it on their 1913 models?—E. C. B.

1—The Delco system as used on the Hudson differs from that used on the Cadillac in that in the former application the distributor is mounted as a unit with the generator, while in the latter it is not.

2—No, the Cadillac Delco installation is similar to that used by the Oldsmobile, but differs in minor details.

3—The users of the Delco system for

1913 are: Cadillac Motor Car Co., Hudson Motor Car Co., Cole Motor Car Co., Oakland Motor Car Co., Olds Motor Works, and Packard Motor Car Co., starting and lighting only.

THE KNOX-MARTIN TRACTOR

Mounds, Utah—Editor Motor Age—In Motor Age issue October 10, page 42, a 15-ton Knox ash cart is illustrated. What are the dimensions of its engine?

2—What is the gear ratio to the rear wheels?

3—Diameter of the rear or driving wheels?

4—Maximum grade it will climb with same gearing? Naturally, this question is intended as referring to a grade of a length to more than use up the momentum of a run.

5—What type of bearings is used in the driving wheels?

6—What type of bearings is used for wheels carrying the heaviest of the load or cart wheels?

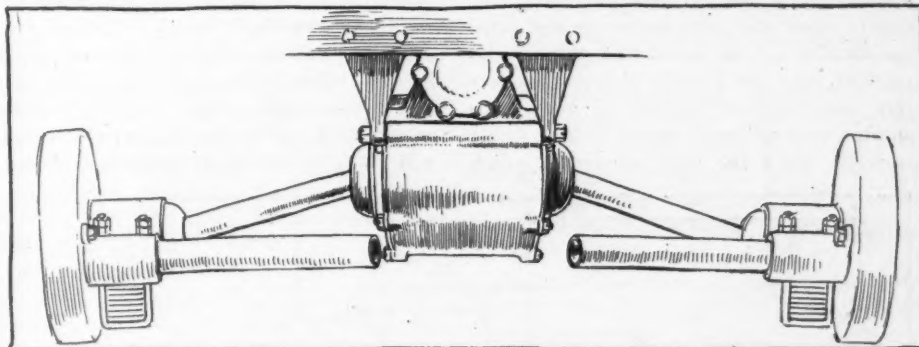


FIG. 2—DE DION-BOUTON TRANSVERSE CARDAN SYSTEM

7—What is the weight of the entire vehicle empty?

8—Give me the names of American manufacturers building motor road trains?—H. A. Hart.

1—The Knox motor, 4-cylinder, 5 by 5½ inches, is used on this tractor.

2—It is geared 12.6 to 1.

3—The driving wheels are 38 inches tire diameter.

4—The Martin tractor is guaranteed to climb a 10 per cent grade, but in a test on California Street hill, San Francisco, it climbed a 20 per cent grade with 8½ tons of lumber on the trailer.

5—Timken type R bearings are used in the rear wheels of the tractor.

6—The wheels used on the trailer run on plain bronze bearings.

7—The weight of the tractor is 3,250 pounds.

8—No road trains are regularly built in America. Tractors similar to the Martin, of the electric type, are built by the General Vehicle Co., of Long Island City, N. Y., and the Couple-Gear Co., of Grand Rapids, Mich.

Carpenter on Long Stroke

Sauk Center Expresses Opinions in Favor of Large Bores for Motor Car Engines

SAUK CENTER, Minn.—Editor Motor Age—I wish to say a few words in support of Charles E. Duryea in Motor Age of November 14. Mr. Duryea gives a most logical argument in favor of the short-stroke motor, and it really seems superfluous for me to add anything in support. I have used both kinds and much prefer the short stroke for many reasons, of which I will give a few.

The short stroke is nearly free from vibration, nearly as flexible as steam in the four-cylinder motor, and in the six it is estimated that it is a little more easy of control and considerable more flexible than steam.

As for greater expansion I fail to see wherein the long stroke comes in or the gain thereby, as the fundamental principles were laid down over 50 years ago and it is useless for us to refer to them only in a mere superficial way. It is a proven fact that at the moment of complete flame propagation, or ignition, and

the total burning of the gases, that the energy developed is far greatest at this instant, and as a matter of fact the more this gas expands the less its power and energy for simple and unalterable laws of nature, as we shall illustrate hereafter. The shock or concussion of a cannon is greater the nearer you are to it and the farther away the less for very simple reasons, which need not here be stated.

When I was a boy a rifle had to be from 40 to 50 inches long in its barrel to be a good, hard, accurate shooter, and in the light of today who would think of appearing ready for the field or forest equipped with such a gun? Experiments have been going on with the rifle and shotgun for a goodly number of years past, and now we have arrived at the truth of the matter under consideration, that the rifle to be best must be about 24 to 28 inches long of barrel, and the shotgun from 28 to 32 inches, with a 30-inch barrel as a standard.

A far greater inertia is established in the short-barreled rifle or shotgun than those of former years for reasons that

have been wrung out of nature's storehouse of knowledge, and scientifically proven best! Who would think for a moment that a rifle, for instance with a barrel a mile long, could this be possible, would do greater execution in use than the modern high-power gun with its 24 to 30-inch barrel? Here we would get far greater expansion, so much more that the bullet would, in all probability, not leave the barrel! Energy is greatest when it is immediately liberated from its controlled home, and becomes weaker as it seeks the realms of space.

In testing explosives the highest power is recorded at the instant of complete propagation of the gases or energies liberated. The short-stroke motor is ideal for its quietness, tremendous energy liberated, easy control, strong crankshaft, short head, compactness in a nutshell, and last, but not least, flexibility, which has brought it side by side and face to face with that old, reliable power, steam. Further, today we see this ye-olden-tyme wasted product, gasoline, the moving spirit in thousands of ways upon both land and sea, developing its almost unlimited resources to the betterment of mankind.

And when it comes to speed the short-stroke motor has demonstrated its superiority upon the race course to the utter satisfaction of its users, and there is no need of comment here in this respect. Its less angularity of connecting rods with shorter piston heads makes it less liable to wear, while the easy manner in which

Pitting the Tire Chains

Kansan Explains Simple Method of Applying Non-Skid Attachment to the Tires

KANSAS CITY, Mo.—Editor Motor Age—There is nothing about the car more important than the tire chains, and on account of the difficulty of putting them on and removing them they are not put on as often as they should be. Chances are often taken which endanger life as well as the car. The following easy method of applying and removing the chains is given with the hope that it will make less difficult this distasteful task and be the means of saving some one a wheel if not a serious accident.

Take the chain for the right rear wheel, holding the hook end of the inside chain in the left hand and about 2 feet farther down grasp the same chain in the right hand; stretch this chain tight and lay it down behind and outside of the right rear wheel. Still stretching this chain tight, move it in behind the wheel. This will lay the chain straight as per the sketch, Fig. 4. Proceed in a like manner with the chain for the left wheel, then move the car back until it stands on the straight cross links.

Taking the loop ends of the side chains in the hands, straighten them out and carry the chain back over the wheel, after which go to the rear and the ends will be in a convenient position for hook-

by the old method of holding the chain in one hand and the bag in the other. The following method will be found much simpler. Hang the chain by its center upon any convenient object such as a top iron, high enough to permit the ends to clear the ground. Then holding the bag in the two hands with the opening below the chain, raise the bag over the chain at the same time lifting the chain off from the top iron and you have the chain quickly bagged.—F. R. Sanborn.

SOME NEW TIRE REPAIR POINTS

Marshall, Minn.—Editor Motor Age—When a broken beer bottle, or a similar cutting curse, has viciously dug out a chunk of rubber from the surface of your casing, exposing the fabric, an immediate repair is very desirable. The small gasoline vulcanizer which every driver with a proper amount of foresight now carries in his kit, can be used to good advantage if the plan here given is followed.

After jacking up the wheel, allow about half the air to remain in if possible, then compress the casing on the sides near the injury so that place to be repaired shall present a convex surface, more so than is normal when the tire is in use. This may best be accomplished with a small clamp, but if this is not at hand, two round sticks compressed to the sides with a strap, will answer the purpose. The surface to be repaired should bulge out considerably.

Clean well with gasoline, then loosen up and undermine the edges of the rubber around the exposed fabric with a sharp point, so as to allow the patching material to be inserted underneath about $\frac{1}{8}$ inch. Cut a piece of unvulcanized rubber patching material a little larger than the exposed surface and carefully insert the edges under the undermined rubber. Wet this patch with gasoline and cover it with another patch a little larger than the first, and apply the gasoline vulcanizer snugly over the patches. When the vulcanizer is removed the surface patched should be considerably more convex than the usual curve of the casing when in use. This is very essential, as otherwise the patch material will be subjected to a pulling strain when in use which tends toward separation, while if done as directed the patch material will be under compression when in use.

It sometimes happens that a section of inner tube becomes destroyed, or it is desirable that a part be removed and a new section be introduced by splicing, either from injury or to change it to suit a larger wheel diameter. The following plan gives good practical results:

After determining the distance between the cut ends of the tube that must be replaced in order to secure the desired length, cut a section of an old or discarded tube which is perfect enough to use 4 inches longer than the gap to be filled. Cut out the ends of an old tin fruit can which has about the same diameter of the

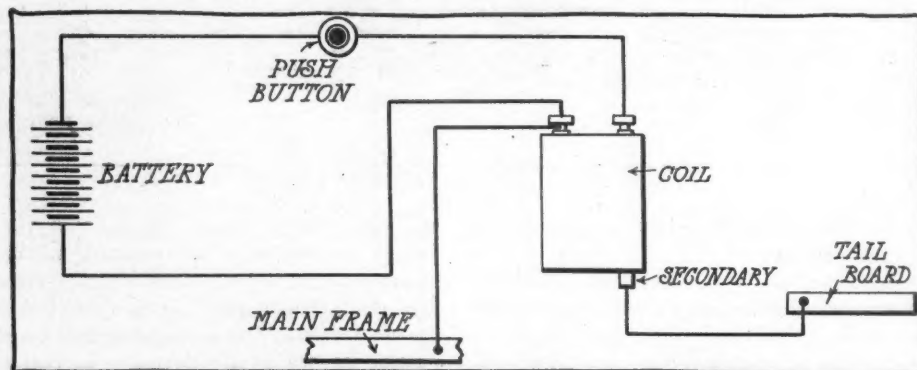


FIG. 3—METHOD OF PREVENTING VEHICLE TRESPASS

it compresses its charge is very apparent to all who investigate. The cylinder is far more easily lubricated with less oil and less resistance, which must be taken into account.

The short-stroke motor is lighter than the long-stroke, far easier of adjustment and we firmly believe greatly more durable in use upon a motor car than the long-stroke, for one readily understands that driving a long-stroke crankshaft at short crankshaft speed would mean a loss much in excess of the lighter motor, with its life greatly shortened.

What we need in the motor world of usability are ease of operating, durability, reliability, accessibility, flexibility, and all these at the minimum of cost.—A. D. Carpenter.

ing. Fasten the inside chain first and then the outside.

To remove and bag the chains, unhook and move the car off from them, washing and drying them, if muddy, or permitting them to dry and remove the mud by beating the chain on the pavement.

Inasmuch as chains are made of steel, they will quickly rust if not cared for. For this reason wet chains should never be put in the bag when wet, to rust out. Frequently, when a careless owner removes his chains from beneath the rear seat, they are rusted into a solid block. Chains should be swabbed with oil grease, or kerosene, before laying away for perhaps several weeks, out of sight and mind.

To put the chains in the bag for carrying them is a difficult feat for one person

tube to be repaired, and insert it into the end of the section that is to be attached, allowing the rubber to project over the tin a trifle.

Pull the end of the inner tube over the end of the section which contains the tin can about 2 inches, then roll it back about $1\frac{1}{2}$ inch. Thoroughly clean with gasoline the rubber around the can and wrap around it a strip of unvulcanized rubber about 1 inch wide, allowing the ends to lap about $\frac{1}{2}$ inch. Apply liquid rubber cement over the strip and rubber adjacent to it, then roll back the end of the inner tube so as to completely cover the unvulcanized strip. With stout cord wrap the joint evenly for the whole 2 inches, and allow to remain for 12 hours. Then remove the cord and by rolling back the free end of the added section remove the can. Insert paper inside the section to be added so that the inner walls will not adhere, and vulcanize with the little gasoline vulcanizer, part at a time, until the entire diameter is treated.

Now insert the end of the added section into the tin can, instead of placing the tin on the inside as before, allowing the end of the section to protrude about 2 inches. Turn this protruding part back over the part around the can, and place a 1-inch wide strip of unvulcanized rubber around it with the ends lapping $\frac{1}{2}$ inch. Clean with gasoline and apply cement, then pull the free end of the tube over the prepared surface just 2 inches, and wrap with cord as before.

When this has remained for about 12 hours undisturbed it will be firmly attached and the spliced surfaces may then be rolled off the can and the can cut so as to remove it from around the inner tube. The splice may then be vulcanized in sections as previously, using care to make the vulcanized portions lap a little.

Where it is possible to do so a patch on the inner side of an inner tube will give a more nearly perfect result. This may be easily done in all openings except small punctures, where it is not required. In large wounds a patch on both sides of the tube will be best.

When from lack of foresight no provision has been made for punctures away from the usual places of repair, restoring a leaky inner tube may be quickly accomplished by the use of common surgeon's adhesive rubber plaster, obtainable for a few cents at any drug store. This plaster comes rolled on tin spools containing from 5 to 10 yards, 1 to 3 inches in width. A wise driver always will carry one of these spools. The plaster is used to prevent bleeding of air from the tire in the same way as it is used by the surgeon to prevent loss of blood from a wound.

When other means are not at hand this plaster may be wrapped around a bad blow-out, using several layers, and permit getting home without too much injury to the religious nature.—A. D. Hard.

Copper Cylinder Jackets

Electric and Air Engine Starters Discussed and Compared for Iowa Reader

JEWELL, Ia.—Editor Motor Age—Is not the copper waterjacket a patented feature of the Cadillac?

2—Are there any other makes of cars using the copper waterjacket?

3—What success is being obtained with the Delco electric starter? Is the Delco used on the Cole and other cars identical with the one used on the 1913 Cadillac? What other cars are using it?

4—Have any of the electric starters proved to be failures?

5—In what way does the Gray & Davis starter differ from the Delco?

6—Would not the air from a compressed-air starter interfere with perfect carburetion in starting the motor, especially in cold weather?—A Reader.

1—No, the use of copper waterjackets is not a patentable feature. The manner of application of those used in the Cadillac car, however, is covered by patents.

2—The Chadwick car, made by the Chadwick Engineering Co., Pottstown, Pa.

3—The Delco electric starting system has been pronounced a success by those manufacturers who have used it. Other cars using the Delco system are Oldsmobile, Hudson, Packard, Cole, Oakland.

4—Motor Age has not heard of any.

5—The Gray & Davis starter is a separate motor, geared to the clutch shaft, entirely distinct from the generator. In the Delco system they are one.

6—No. The air is introduced into the cylinders on the working stroke, through check valves. The suction is not interfered with, and upon the first explosion, the check-valve is closed, so that no air is admitted to the cylinder.

ADJUSTMENTS OF 1910 MOLINE

Astoria, O.—Editor Motor Age—What causes a $1\frac{1}{4}$ -inch model L Schebler carburetor to overflow for 3 or 4 minutes every time the motor stops?

2—What should one do with a cone clutch to prevent a car starting with a jerk, say on a 1910 Moline?—J. O. Bay.

1—Your float-valve is out order on the end of the needle-valve of the gasoline feed on the Schebler model L, is the float-lever adjusting nut, which may be disconnected from the float lever and turned up to cause the valve to close at a lower gasoline level. Try it at one turn, and if this does not stop the flooding, give it one more. If the carburetor still floods the float is probably water-logged, and should be unscrewed from the float lever and dried over a radiator or in a moderate oven, and reshellaced. Dipping in thin shellac and drying, for several coats will be found the most satisfactory manner of restoring the float's buoyancy. In replacing the float, the supply-valve should be readjusted as for a new float.

2—The corks in the clutch facing are probably worn. It will temporarily relieve this condition if you will adjust the spring to a slightly softer pressure. However, you will find that this will produce a less positive grip, and in heavy pulling will probably result in clutch slippage. To make the repair permanent, the clutch must be disassembled, and new corks put in. To do this, take off the collar and thrust bearing. Then remove the six bolts of the housing, remove the spring, and take out the cone. Secure a new set of corks from your local agent. Remove the old ones which you will find have been worn down flush with the cone, and press the new ones in by hand, cutting them off, after they have been pressed in firmly, about $\frac{1}{8}$ inch above the leather, and pound down nearly flush with a mallet. This will be found an easier repair than putting on a new leather facing, which you will be obliged to do if you run the clutch much longer with worn cork inserts.

REPLACING GEARS WITH RAWHIDE

Butte, Mont.—Editor Motor Age—I have a car with a Rutenber six-cylinder motor, a Bosch high-tension magneto, a battery system with a Heinze vibrating coil. I would like to know if I could change it into a dual system, and how it could be done.

2—The timing gear on this motor is very noisy. Could I have fiber or rawhide gears made? Does Motor Age think they would last any length of time where they come in contact with the oil. The gears that are on now make a clattering noise, although worn little.—T. H. S.

1—It is impossible to answer this question without knowing what type of Bosch magneto is used.

1—Rawhide gears frequently are used for this purpose, and are especially treated to resist oil and water. If your present gears are not badly worn or otherwise defective they should run with a reasonable amount of quiet. Motor Age would suggest that you try adjustment before discarding them. The best gears in the world will clatter if not meshing properly. Perhaps it is not the gears that are responsible at all, but the valve tappets.

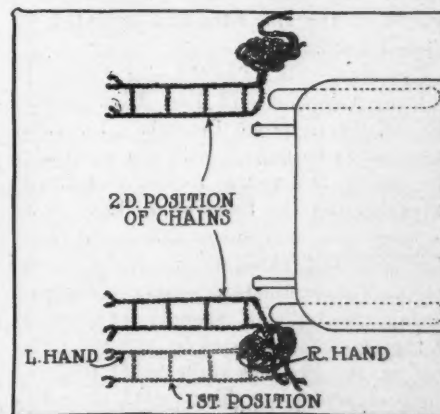


FIG. 4—SANBORN'S METHOD OF APPLYING CHAINS



Current Motor Car Patents

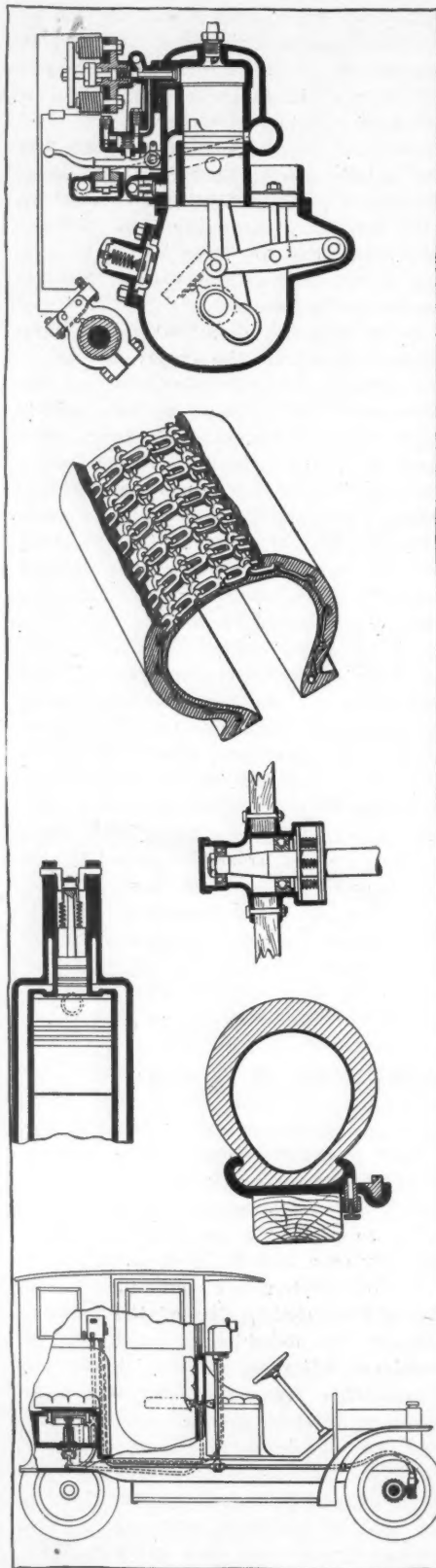


THRUST Cushion—No. 1,046,589—To Harry Harding, Rochester, N. Y. Filed February 5, 1912, dated December 5, 1912. To absorb the shocks incident to turning, etc., that are exerted on the wheels and axles of vehicles, and thereby save them from shock and the vehicle from undue vibration, this device consists of a collar on the axle, facing a similar abutment on an extension cup on the hub of the wheel, between which springs, mounted on telescoping guides, are disposed. Disks are interposed between the opposing faces to reduce friction. These springs resist and cushion all intrusts of the hubs upon the axle.

Automatic Taximeter Control—No. 1,046,808—To Max Kuhn and Raphael Netter, New York, said Netter assignor to Kuhn. Filed August 26, 1911, dated December 10, 1912. To automatically throw in a clutch in a taximeter for the purpose of registering fare for an additional passenger, this device consists of a pivoted seat, with a linkage connecting it to the clutch-operating mechanism. When the seat is up, fare will be recorded for the occupants of the other seats only, but when turned down for occupancy, the clutch will be engaged and fare for one more passenger will be recorded by the taximeter. The rear seat is likewise linked to a clutch. It is mounted on a vertical pillar, connected to an angle lever, and normally held in a raised position by a spring. The weight of a passenger actuates the clutch by pressing down the vertical pillar, and moving the lever.

Detachable Tire Arrangement—No. 1,046,855—To Peter Reconi, San Francisco, Cal. Filed October 21, 1911, dated December 10, 1912. In detaching a tire from the wheel, difficulty is often experienced in removing the locking split-ring, owing to the pressure of the clincher ring upon it. This device consists of a latch, adapted to hold this ring away from the locking ring, while it is removed or replaced. The latch comprises a spring bolt, located in the rim base and operated by a small knob.

Tire Mail—No. 1,046,451—To Joseph B. Duhring, Chestnut Hill, Pa. Filed December 15, 1911, dated December 10, 1912. Designed to be imbedded in the tread of a tire casing, this patent relates to a means of connecting the links of a chain so as to form one continuous fabric to resist blow-outs and skidding, upon being exposed. This method of joining consists of having the links of strands longitudinal of the tire tube, crossed by strands crosswise of the tire, the links being made of single stampings of sheet metal, each link of the longitudinal strands being inclosed on one leg by the half of the superim-



PATENTS ISSUED DECEMBER 10, 1912

Randolph Engine

Duhring Tire

Harding Thrust and Butsch Valve

Reconi Rim

Kuhn & Netter Taximeter

posed cross link above it. The chains so disposed are vulcanized in the tire as a part of the fabric, reinforcing the casing against blow-outs and yet by virtue of its interwoven construction, flexibility and lightness, hindering the resilience of the tire little.

Simple Piston Valve—No. 1,046,965—To Alphonse Butsch, St. Lucia, British West Indies. Filed October 1, 1909, renewed and this application filed September 27, 1912, dated December 10, 1912. In an internal combustion engine, this patent related to a piston valve located in an auxiliary cylinder disposed in the head of the main cylinder. This valve-piston is connected to a crank, by which it is operated. When the piston is raised it uncovers the valve port, and when it descends, it closes it. This patent does not pertain to a complete engine, but only to the valve-action, hence its incompleteness.

Two-Cycle Engine—No. 1,046,491—To Alfred Randolph, Salem, Ohio. Filed August 24, 1910, dated December 10, 1912. Comprising a two-port two-cycle engine, this patent relates to an engine in which a piston is adapted to induce alternately a suction and a compression in the crankcase, for the purpose of drawing in air, and expelling it through a port in the cylinder opened by the piston on the bottom of its stroke. In this crankcase is a small open-ended cylinder in which an auxiliary piston, linked to a lever operates, as actuated by an auxiliary connecting rod to the lever from the main piston. The purpose of this piston is to aid the main piston in drawing in a greater charge for compression and compressing it to a higher pressure before admission to the cylinder. Fuel is injected about the spark plug through an injection port, normally closed by a valve, which, electrically operated by means of electromagnets and an armature bar, is opened at the proper moment, as timed by a commutator geared to the engine, in the circuit of the operating magnets. In operation, on the explosion stroke, the piston and auxiliary piston are forced down, until the piston reaches the bottom of its stroke when the gases escape through the exhaust port. On the upstroke the piston and auxiliary piston move upwards, creating a vacuum in the crankcase, which is filled with air through a check-valve in the engine base. On the next downstroke this air is compressed, and on the piston reaching the bottom of its stroke, the air is admitted to the cylinder through the transfer passage. During the upstroke the air is compressed in the cylinder and the injection valve electrically opened, injecting a charge of fuel, which is ignited on the piston reaching the top of its stroke.

The Motor Car Repair Shop

Ingenious Brake-Arm Adjustment

IN Fig. 1 is shown means of rendering the brake arms of a motor car adjustable to such an extent that the entire cam can be worn out before a replacement is required; and in taxicab service, where the strictest economy must be exercised to give efficient service at a profit, provisions of this sort are quite necessary. As in many cars, the brakes of the particular make of car on which this kink is practiced, are operated by a double-nosed cam which expands the ends of two semi-circular brake shoes. The cam in turn is secured to a short shaft, which is operated by a lever R located at its opposite end. When the cam becomes worn to a certain extent, the brake lever strikes against the rear-axle tubing T, thereby putting a stop to the pressure applied to the cam on the end of the brake-shoes, and so reducing the efficiency of the brakes.

To overcome all this trouble and get the maximum wear out of the cams, an old but well applied scheme is used which consists in dividing the wrist at the lower end of the arm R, cutting teeth in the adjacent surfaces of the portions thus formed, and then just securing the one portion to the shaft with the pin P and holding the other portion in engagement with the teeth thereof by means of the nut N.

While on the subject of brake adjustments it might be well to add that although the operation of adjusting a set of brakes should be a very simple operation, some drivers are so negligent of their brakes that the task becomes a very difficult one. To adjust a set of brakes one should first see that the wheel bearings are properly adjusted, then set the brake bands so that there will be just enough clearance for about two thicknesses of ordinary letter paper to be slipped all the way around when the brakes are released. This is to prevent dragging. All working parts of the brake operating mechanisms should be well cleaned and oiled from time to time so that perfect freedom of action is assured. Owing to loose wheel bearings brake bands are often worn unevenly, and in such cases new linings or bands are necessary.

Wooden Horse Useful in Shop

Wooden horses are most useful articles of repairshop equipment, and every repairshop generally can use a half-dozen wooden horses to a good advantage. Where no other special facilities are provided they are most useful in supporting a motor or chassis in the process of cleaning, repair or overhauling; for supporting the body while removed from the chassis; or for the convenient support of

Horse Repairshop Aid

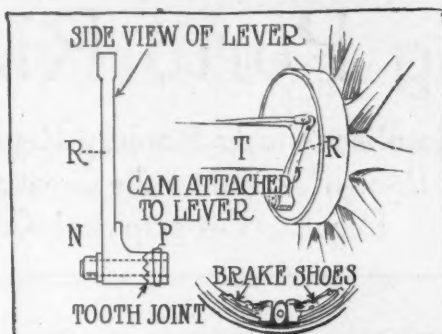


FIG. 1—NOVEL ADJUSTMENT OF BRAKE TO TAKE UP WEAR

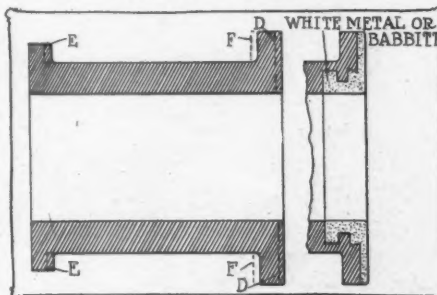


FIG. 2—REBUSHING FLYWHEEL-END BEARING

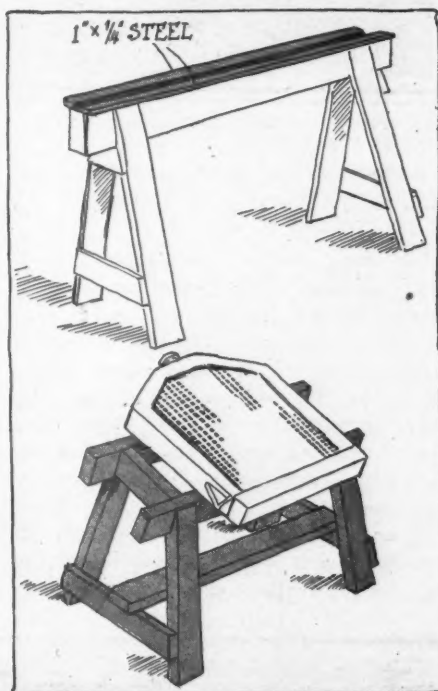


FIG. 3—TWO METHODS OF MAKING WOODEN HORSES USEFUL IN SHOP

any of the separate units of a motor car while operations are being performed upon them by the workmen of a shop.

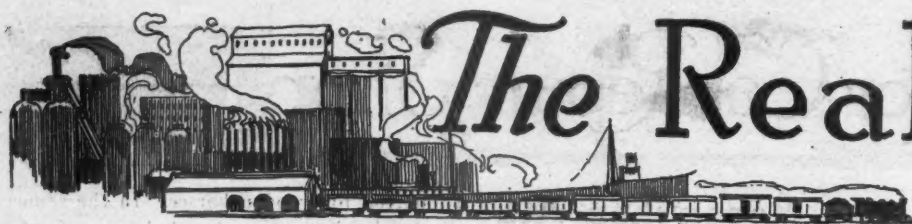
Two small wooden horses are employed in one shop to support the rear end of a chassis while the rear axle is removed for inspection or repair. The springs of the vehicle rest on a piece of pipe in turn

supported by wooden horses. In the same illustration is a motor mounted on a pair of wooden horses for a similar purpose. There are many other uses to which the wooden horse may be put, that will greatly facilitate the work of the repairman; and in so doing soon save the initial cost of their installation. In Fig. 3 two horses are shown. In the upper part of the illustration, a substantially constructed horse is shown with two strips of iron or steel about an inch wide and 1/4-inch thick secured to the top of the horse throughout its length. Horses of this type are designed for supporting chassis and chassis frames while being re-riveted, straightened, etc.; the metal strips serving to protect the wood and maintain a true surface. The horse in the lower section of Fig. 3, is designed especially for the purpose of supporting radiators while being cleaned, inspected or repaired. A similar structure could be very easily arranged for temporary use by simply setting two ordinary horses side by side and securing them in this relative position by means of a couple of boards and some nails. A few boards laid across the top of a pair of horses also makes a very handy portable work bench or table.

Rebushing Motor End Bearing

There are many old cars in use in which there are no thrust bearings for the motor crankshaft other than a flange on the outer end of the flywheel-end bearing, thus when the throwing out of the clutch creates an end thrust on the crankshaft, there is a tendency toward rapid wear on this flange as indicated by the dotted line D, Fig. 2. The repair in such cases generally consists in cutting a little metal off the face of the flange to smooth and true it up, and cutting more metal off the smaller flange at the other end of the bearing, as indicated by the dotted line E, so that the bushing can be moved forward and the end play eliminated; the space indicated by the dotted line F would then be filled in with white metal or a brass ring sweated on.

At the right of this illustration is shown a more up-to-date and far more effective repair, which consists simply in replacing the worn-off metal with white metal. The bushing is turned out at the outer end with a dove-tail and groove to form a grip for the white metal, then by use of a suitable mold for pouring the white metal, the end of the flange is built up with it to its original contour. It is customary, of course, to make the white metal insertion a trifle larger than the original end of the bushing so that it may be machined and scraped to fit the crankshaft. It is claimed that a repair of this kind will outlast the rest of the bushing.



The Realm of the

Motor Solving Porto Rican Problem



ONE WAY OF HAULING MERCHANDISE

By Harwood Hull

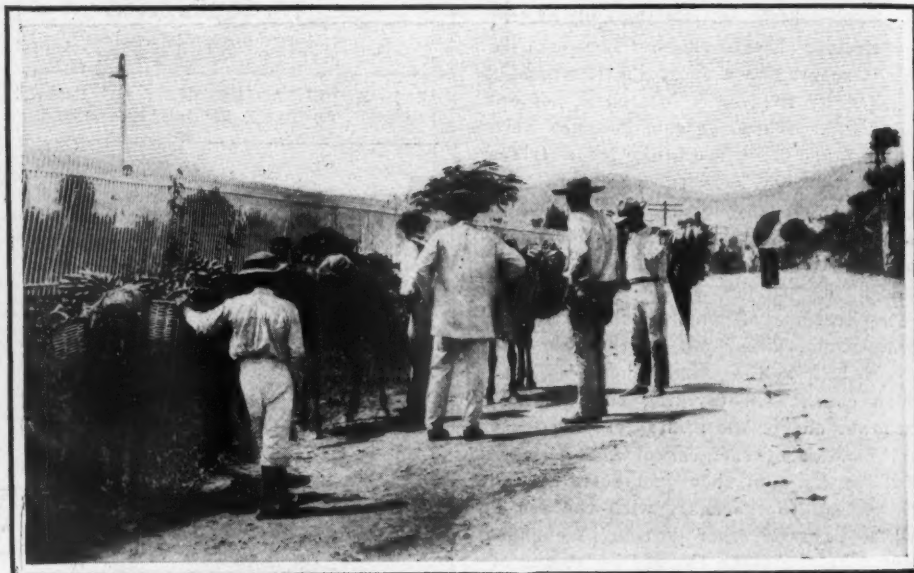
THE motor truck is helping solve an intensely interesting transportation problem in Porto Rico. Gasoline motors are rapidly replacing bull carts in heavy overland traffic. An almost unprecedented agricultural development, together with peculiar geographical conditions, has practically forced the change in this far-off country.

Size of Porto Rico

Porto Rico has an area of 3,600 square miles and a population of 1¼ million people. But three of the nine principal ports scattered around the coast line are landlocked. Through San Juan, the principal port, at least three-fifths of the external commerce of the island, which amounted to \$92,000,000 last year, passes. There is but one inland railway, extending from San Juan to Caguas, a distance of 36 kilometers.

The main rail line is that of the American Railroad, extending from San Juan around the west coast to Ponce, on the south coast and on to Guayama. It passes through, or connects with, the ports at San Juan, Aguadilla, Mayaguez, Guanica Central, Ponce and Aguirre Central, near Guayama. The east coast, from Guayama on the south to San Juan on the north, and the entire interior,

Gasoline Trucks Rapidly Replacing Bull Carts on the Island, Brought About by the Great Agricultural Development and Peculiar Geographical Conditions—Seventy in Use.



PORTO RICO HAS VARIOUS METHODS OF TRANSPORTING MERCHANDISE

is without railroad facilities at the present time, so motor trucks are popular on the island of Porto Rico.

San Juan has a well-sheltered landlocked harbor. The harbor at Guanica Central, as well as that at Aguirre Central, also is sheltered. The last two-named harbors, however, are used almost exclusively for the shipping of sugar, the largest sugar mills in Porto Rico being located at these two places. The harbors at Fajardo, Naguabo and Humacao, on the east coast, Ponce on the south and Mayaguez and Aguadilla on the west are all open roadsteads. At some seasons of the year rough weather makes lightering in

these ports dangerous if not impossible of accomplishment.

The agricultural products of the vast interior must be gotten to the ports and the people of the interior must be supplied with food. It is in this field that the motor truck has become active.

Seventy Trucks in Porto Rico

Of the seventy motor trucks now operated there at least half of them have been purchased within the last year. The Atlas Transfer Co., a branch of the Atlas line, was the first trucking company in the field. It operates a string of Speedwell trucks.

The biggest company, however, is the Porto Rico Motor Co., a New York corporation, that now is operating twenty-one Saurer trucks. This company started last May with ten trucks and within a few months had increased the number to twenty-one. Ten more will be in the field before January 1.

There is a good story back of the formation of this company. The International Motor Co. sent a man to Porto Rico to demonstrate a Saurer truck. He was greatly impressed with the good roads of the island



OXEN HAULING FRUIT

Commercial Car



Great Possibilities of the Island

Several Companies Already Formed for Purpose of Operating Lines for Transportation of Passengers and the Carrying of Merchandise—Not Competing with Railroads



CARAVAN OF OX TEAMS HAULING MERCHANDISE ON PORTO RICO'S GOOD ROADS

and the possibilities of the truck. When he returned to New York he told a friend, a driver for Michael M. Van Buren, of Jesup & Van Buren, brokers, at 7 Wall street, of his trip to Porto Rico and what a wonderful field he considered it for the motor truck. The friend in turn told Mr. Van Buren, who is related to John D. Archbold, president of the Standard Oil Co. Mr. Jesup, Mr. Van Buren's partner, also became interested, as did Mr. Archbold. Eventually these three men went to Porto Rico to look over the field.

Possibilities Investigated

They were so impressed that an expert traffic man was at once sent to the island to go into the whole transportation question. The report of this traffic man was so favorable that the Porto Rico Motor Co. was at once organized, a staff of men recruited to operate the company and ten trucks were purchased. A single truck has been sent down previously as an experiment. The equipment and the employes of the new company left New York last March. The first hauling was done in May.

Michael M. Van Buren is president of the Porto Rico Motor Co., Richard

M. Jesup is first vice-president, W. L. Hodges is second vice-president and general manager, and R. H. Johnson is secretary and treasurer. Mr. Hodges is the head of the company in Porto Rico and under him is a complete executive and operating staff. This company has a large garage in San Juan and a machine shop is now being equipped. It will be the most complete motor machine shop in Porto Rico.

Probably the Porto Rico Motor Co. has gone into the question of motor transportation more thoroughly than any other company or individual there. It has worked out a complete scale of rates and



TWO-WHEELED DONKEY CART UTILIZED



RIVAL OF MOTOR TRUCK IN PORTO RICO

has distributed its cars so as to be most effective.

The rates as a general thing are based on the rates charged by bull carts. Ordinarily this rate is 1 cent per hundred weight per kilometer. This, of course, varies. In some instances the rates of the motor company are less than those charged by the cart drivers, while in some instances they are greater. The length of the haul, the nature of the cargo, the possibility of a load both ways and other items enter into determining the rate.

Not Competing With Railroads

Most of the Porto Rico Motor Co.'s trucks are in San Juan. Four of them, however, are stationed at Ponce, where they haul sugar, coffee, provisions and general merchandise. Two other trucks are at Bayamon, in the fruit district. There is one truck at Guayama hauling sugar, mostly, while there are two more at Caguas, in the tobacco district. All the trucks of this company are of 5-ton capacity.

No attempt is made by any of the motor truck owners to compete with the railroads, although in some instances they do. For instance, except in unusual cases, a load of freight will not be sent by motor from San Juan to Ponce. The American Railroad can make the haul



FIRST SAURER TRUCK TO BE DRIVEN ACROSS PORTO RICO AND BACK

cheaper than can the motor trucks. There is considerable truck traffic between Caguas and San Juan, however, in a measure in competition with Caguas tramway. One explanation for this, however, is that the loads originate inland away from the railroad, and it is cheaper to continue the haul to San Juan than to reload to the tramway at Caguas. Most of the hauling, however, is to and from inland points not reached by the railroads.

Many Oxen Still Used

Until the coming of the motor truck all the inland hauling was done with bull carts. This will continue to be the chief means of transportation for many years to come, because there are thousands of yoke of oxen there and much of the island is not accessible to the motor truck. A few American mules have been imported, but they are owned mostly by the large tobacco plantations and cut no great figure in the transportation question. Horses, or the native ponies, are used almost wholly in the cities and for local traffic, and do their work well.

The agricultural products of Porto Rico are almost entirely exported. The people raise little of their own food. For instance, last year Porto Rico exported 350,000 tons of sugar to the United States to be refined. There was 20,000 tons of coffee exported, thousands of boxes of fruit, tons of leaf tobacco and 180,000,000 cigars also were shipped out of the island. In many instances these products were hauled overland to the coast for export. In turn more than 65,000 tons of rice and many tons of codfish were imported and had to be distributed. The value of the imports exceeded \$40,000,000, while the exports exceeded \$50,000,000.

For slow traffic ox teams meet all requirements. An ox team will travel 2 miles an hour for 12 hours. Then the team must be put on pasture for 24 hours. For most traffic in Porto Rico, however, two and sometimes three teams of oxen are required. This is for a change in the yoke

and for additional teams on some of the hills. The load carried by the ox carts varies from 1½ to about 3 tons.

Capacity of Motor Trucks

A motor truck will carry 5 tons and will do from 60 to 100 miles a day. In one instance a truck of the Porto Rico Motor Co. covered 150 miles in a day—but it was more than a 10-hour day.

Another objection to the ox carts is the fact that the drivers do not own their own teams and feel little or no responsibility for the cargo they carry. In intelligence the ox-team drivers cannot be compared with the truck drivers.

The average gross earning of a 5-ton motor truck in Porto Rico is about \$45 a day. This, of course, varies. Most of the motor truck drivers get from \$75 to \$150 per month. The Porto Rico Motor Co. has thirty drivers and each gets \$150 a month. Besides being a driver, each man is a machinist, capable of caring for his car on the road and can go in the shop when he is not otherwise busy.

Besides the Porto Rico Motor Co., the

chief trucking companies are the Atlas Transfer Co., San Juan, using Speedwell trucks; the Ponce Auto Transfer Co., Ponce, with Pope; the Aguadilla Transportation Co., Aguadilla, with several Macks; Compania de Transportes, at Maricao, with Saurers, and the Garage Mayaguez, Inc., at Mayaguez.

Besides these companies there are many business houses that own their own trucks and keep them constantly busy. There are a few individuals owning a truck or two doing contract work.

Invading Many Fields

The truck already has gone into all sorts of business. The Fitzpatrick-Wehar Fruit and Land Co., at Bayamon, has a Mack to haul its fruit from the plantation to Catano to be loaded on lighters for transfer to San Juan. The Porto Rico Brewing Co. has Peerless trucks for its deliveries. In Arroyo there are two steel-tired Aries trucks used in hauling sugar and provisions. The Cayey Sugar Co. has Mack trucks, while the Juncos Central operated Saurers and other trucks. The Utuado Sugar Co. operates a Peerless. The Cayey-Caguas Tobacco Co. has a Mack truck to bring its cigars to San Juan, while the Porto Rican Leaf Tobacco Co. operates Knox trucks.

Among the trucks in use there are the Saurer, American, Wilcox, Peerless, Knox, Lee, Aries, Pope, Speedwell, Mercedes, Hewet, Benz, Laurer, Alco, Old Reliable, Federal, and among the smaller commercial cars are the Reo, Kissel, Metzger and Buick delivery.

It is pretty hard to forecast what the possibilities for the extension of the motor truck there are. In a general way this development is limited only by the extension of good roads and the total tonnage of the imports and exports to be handled to and from the interior.

Truck traffic is bound to increase. The change from bull carts at first was so radical that many merchants were skeptical. They are now, however, patronizing



TRUCK USED IN PORTO RICAN SANITARY SERVICE DURING BUBONIC PLAGUE



SPEEDWELL TRUCK CARRYING SCHOOL BOOKS FOR PORTO RICAN GOVERNMENT

the truck in preference to ox carts in many instances. The quick deliveries of the truck have enabled some of these inland merchants to turn their money faster and they will patronize anything that will help them make money. The bull cart always will exist there, but more and more the ox teams will be sent back to field work.

MILLERS TELL OF TRUCK WORK

Each month the Albers Brothers Milling Co., Tacoma, sends in a report of the performance of its White truck to the local agency. The report for October is as follows:

"We have had our truck for the past 10 months and have increased the tonnage every month, but have about reached the limit, as an average of 60 miles a day we consider pretty fair work. Since we have been delivering with the truck we have extended our territory to Puyallup, Fern Hill and South Tacoma.

"The total cost of operation for the month of September was \$195.85. This includes wages of the driver, cost of gasoline, oil, tire wear and estimated depreciation. The White truck, having a capacity of 1½ tons, delivered 346 tons during the month, covering a distance of 1,456 miles. The average cost per mile of miles covered each day by the motor truck was 60½."

BALTIMORE CHANGING

The Baltimore Fire department will begin the process of motorization early next year. Through the appropriation of \$46,000 made to the fire department in the 1913 ordinance of estimates, four fire engines and ten hose wagons, at present horse-drawn, will be converted. The fire engines will be converted by means of the tractor, a two-wheeled device, which will be installed in front of the apparatus, while the bodies of the ten hose wagons will be transferred directly to motor car chassis. An additional appropriation of \$6,000 for three cars for district engineers is also made.

Thus will begin the exodus of the fire horse. In appropriating the amount necessary to change these fourteen pieces of fire apparatus into motor-propelled vehicles, the board of estimates has concurred in the plan of the fire department to gradually eliminate the horse. According to present plans, no more horses will be purchased, but as the animals become old, maimed or useless, they will be allowed to drop out, and their places will be filled by motors.

Baltimore has been gradually coming to the use of motor cars in the fire department. First, a car was purchased for the chief engineer, then more were provided for the district chiefs, and with the completion of the high-pressure pipe-line, motor hose wagons were purchased to carry the equipment of that system.

New improvements to be made during the coming year will cost \$164,759.32. Of this amount, \$65,000 will be used for the rebuilding of the fire-boat Cataract, \$5,775 for fifteen high-pressure heads, \$4,000 for repair shop tools, \$6,000 for three cars for district engineers, \$7,425

for manning No. 18 truck company, to be installed in No. 20 engine house; \$15,559.32 for extra work at the pumping station; \$46,000 for the motor equipment already mentioned.

HELPS A CONTRACTOR

Motor truck efficiency of high order was shown recently by a Locomobile 5-ton truck which is working on a big construction contract at Woodbridge, near New Haven, Conn., where the C. W. Blakeslee Construction Co., contractor of the latter city, is building an immense storage dam for the New Haven Water Co. The site of the dam is about 9 miles from the city and to reach it a road must be traversed on which are quite a number of very steep hills and many soft stretches.

Among the various supplies used on the work were long timbers, weighing about 1,700 pounds each. In order to facilitate the transportation of these immense timbers, the Blakeslee company, which has been a user of motor trucks for some time, had a trailer of special design built. This trailer, which weighs 3,000 pounds unloaded, is so built that a portion of the load is carried on the trailer and part on the truck proper, this being made possible by a turning swivel placed on the platform of the truck.

This trailer was, of course, intended for use with trucks already in the service of the Blakeslee company, but it was soon found that a more powerful truck by far was necessary and it was at this juncture that the Locomobile was placed on the work.

This truck made several trips to the dam during each day, carrying ordinarily twelve of the giant timbers referred to above, each one being 12½ by 12½ inches by 34 feet, and weighing 1,700 pounds, making a total of 20,400 pounds or over ten tons. These timbers were loaded by means of a derrick, and although this operation consumed about 20 minutes, the trips were made in about ¼ hour. The regular roads are very bad.



HAULING SUGAR CANE THROUGH A PORTO RICAN RIVER

FOOLED the Owner — A Minneapolis physician arrested for driving his car at more than 40 miles an hour offered to pay a city detective \$100 if he could make the car go that fast. The detective won, refused the money and the physician turned it over to a charity. The fine was \$20.

Country Club Makes Money—The report of the St. Paul Automobile Club's new White Bear lake club house for the season showed a profit in its first year. Previous years from the club on Lake St. Croix there was a shortage. At the annual meeting in January provision is expected to buy the land on which the lease expires. The property is 32 acres with nine cottages. The club will erect a new house.

Refuses to Impose Tax—Montreal's request for permission to impose a special tax of \$15 on chauffeurs, owners or drivers of motor vehicles used for conveyance of passengers, and a tax not exceeding \$100 on motor vehicles used for commercial purposes has been rejected by the private bills committee of the legislature. At present all license fees from motor vehicles, whether used for pleasure or commercial purposes, and fines, go to the provincial treasury. Montreal desired to control chauffeurs through a tax and get a revenue from the motor trucks which are gradually replacing wagons and cars for hauling merchandise. These use the city streets exclusively.

Planning Country Club—The Cincinnati Automobile Club is to have a new country home. It is planned to purchase land about 6 miles out from the city and to erect a modern club house. Tennis courts and golf links may be built on the grounds. The deal is expected to be closed within a short time and the use of the premises made possible by the summer of 1913. The Cincinnati Automobile Country Club Co. has been incorporated for \$35,000 by Bert Moorman, William Johns, J. H. Davis, D. C. Callian, and Ben E. Nelson. The downtown rooms of the club will be maintained at the new Gibson house. Temporary headquarters are now at the Herschede building on Fourth avenue.

Quebec to Raise Limit—The speed limit in both cities and country districts throughout the province of Quebec will be raised. It is announced the present city limitation of 9 miles will be increased to 15 miles. The bill also will provide that the speed rate in the rural sections shall be increased from 15 to 25 miles an hour. The chief reason for permitting motor cars to run at a higher rate of speed in the cities is that it is contended that it is impossible to mount Montreal and Quebec hills when but 9 miles is the legal speed. The fact that a motor car may run in cities up to 15 miles an hour does not remove the responsibility of using precaution so as not to endanger life or limb of any person, nor in any event faster than 9 miles an hour within a city, town or village or on any highway, nor more than 15 miles else-

where. In other words, in a congested street in Montreal, where the speed of under 9 miles an hour is required, judgment must be exercised. The same exercise of judgment will be necessary in the new law, when perhaps 4 miles an hour would be the only safe thing to permit in certain districts.

Demands Wide Tires—Director of Public Service J. R. Cowell has asked the Toledo police department to enforce strictly the city ordinance regulating the size of tires on wagons using improved streets, especially asphalt pavements. The ordinance calls for tires 4 inches wide on trucks carrying 3 tons, and it is said that many trucks are using narrower tires and exceeding the load limit, this cutting up the streets badly.

Syracuse Club Reinstated—The New York State Automobile Association held its annual meeting at Utica last week and practically reinstated the Automobile Club of Syracuse to membership. The club withdrew from the state body more than a year ago, the main reason being that it objected to paying the heavy dues levied, not being satisfied with the way in which the money was spent. The members thought the money could be better expended in local work. The Syracuse club had made no overtures for reinstatement.

Claim Wrong Horsepower—Alleged misrepresentation of cars is being investigated by the Pennsylvania state highway department. Owners applying for 1913 licenses, it is said, have underestimated the power of their machines for the purpose of saving on the license fee they must pay. The license for a 20-horsepower machine is \$10, while the 19-horsepower car will cost the owner \$5. It is said that ninety-three of the applications for cars, whose real horsepower is 20 or more horsepower, but which was set forth in the application as 19 horsepower, are being

looked up by the bureau. In all these cases the department charged \$10 for the licenses, basing the power on advertisements of the firms which turned out the cars.

To Bar Colored Lights—A bill will be presented to the city council in St. Louis in a few days that will, if passed, make it a misdemeanor for the owner of a motor car to equip and display on the front of his car red and green lights. Some owners here have so equipped their cars and many motorists and pedestrians have complained, stating that it is dangerous, as one cannot tell whether the car so equipped is going or coming.

Mufflers Demanded—Two ordinances, one providing for a more uniform and efficient method of regulating the storage of gasoline for protection against fire, and the second compelling installation of mufflers on all motor cars have been approved by the city council of Philadelphia. A ruling also has been promulgated that hereafter owners allowing their cars to unnecessarily emit gases, obnoxious odors and smoke will be arrested and fined.

Bay State Holds Banquet—The banquet of the Bay State A. A. was held Monday night at the Copley Plaza, Boston's leading hotel, and there were more than 300 present. President Ernest A. Gilmore presided. The program comprised addresses by Mayor Fitzgerald of Boston on the city's needs from a motor point of view; President James J. Storrow of the Boston chamber of commerce, and a director of the General Motors Co., on the motor industry from a business standpoint; Wilbur D. Nesbit, of Chicago, the poet and humorist, on the funny side of motoring; and A. G. Batchelder, chairman of the executive committee of the A. A. A., who

Old Roads Made New



ROAD NEAR PETERSBURG, VA., AS IT USED TO BE

Four Winds

spoke on motor organizations and the good they accomplish. Many of the songs that made a hit during the minstrel show given by the association some months ago were sung by the members making the banquet a lively affair.

Winter Re-elected—A. F. Winter has been elected president of the Sheboygan Automobile Club, of Sheboygan, Wis., which recently was rejuvenated and now has a total of nearly 200 members. J. H. Optenberg was elected vice-president and Arthur F. Raab is the new secretary and treasurer. T. M. Bowler continues as counsel and will take an important part in the Wisconsin State A. A.'s work before the coming session of the legislature. The membership fee consists of \$5 annual dues, nearly all of which is expended in highway improvement. Counsel Bowler and Secretary Raab are framing several ordinances for passage by the Sheboygan council, among them a universal light law, sensible signal act, and rules of the road law. Sheboygan is a city of 26,000 inhabitants.

California Signboarding—Eleven hundred miles of road in the arid desert country to the northeast of Los Angeles county, Cal., has been posted recently by the Automobile Club of Southern California. The work is being done by O. K. Parker, engineer of the local club, and is the first installment of about 5,000 miles of desert roads that soon will bear the welcome emblems of the club. The sign-posting already done is along the main and lateral roads between Daggett and Needles to the north and south of the Santa Fe railroad. Parker found the desert roads in fair condition, although in many places they were well nigh impassable. He spoke in glowing terms of the wooden motor road between Blythe Junction and Blythe, in the Palo Verde valley. The road is built of huge

planks and is about 2½ miles long. It is erected over a stretch of bottomless sand and is the only road of its kind in the world.

Penn Collecting Fees—Revenue from 1913 motor licenses in Pennsylvania is already up to a tenth of the total income from that source for last year. Thus far 600 cars and 2,400 drivers have been licensed. Every car that is seen on the highways of the state after New Year's day or thereafter without an olive-green tag is being run in violation of the law and the owner is liable to arrest. The number of licenses issued during 1912 has passed the 65,000 mark.

Gophers Blazing Trails—Four crews are surveying in the northern part of Minnesota for highways to be built under the new Elwell law. One party is working on the projected International Falls-Twin City road, another on the Duluth-Winnipeg road, the third is at work on the Duluth-Moorhead road and the fourth on the Bemidji-Beaudette road. A concrete road is projected from Minneapolis to Hopkins on the Minnetonka highway. The Winona Automobile Association is planning to widen to 20 feet the Winona-Minnesota City road and resurfacing with gravel. This stretch is 2 miles.

Illinois After Road Rata—Illinois farmers are asked to supply information to the Illinois legislative committee, appointed by the last general assembly to revise the road and bridge laws. A list of questions has been prepared, asking each farmer if he favors a continuation of the present system of road management and if not, to give his ideas for improvement. Farmers also are asked if they favor the construction of permanent hard roads with state aid, and if they want a special highway commission to have supervision over all roads of the state, with a county engineer to co-operate with the state body. It is be-

lieved that these questions will receive many replies and furnish the committee with an intelligent idea of the wishes of the agriculturists of the state.

Antigo Active—The Antigo Automobile Club and the Commercial Club of Antigo, Wis., have formed an alliance to boost the good roads movement and to raise funds for improvement of highways until the county government can make permanent improvements with state aid. During the past summer the two associations have jointly superintended and paid for the construction of a mile of model highway running out of the city. The county has built several miles of macadam road, following the example. Next year the county has determined to expend \$25,000 in permanent improvement.

Another Baltimore Tax Asked—Dealers and owners of motor cars in Baltimore city are aroused over the plan of Mayor Preston and City Solicitor Field to introduce an ordinance in the city council taxing cars from \$5 to \$50. The Automobile Club of Maryland will fight the proposed tax, the members claiming the tax will have a harmful effect upon the business locally and will make Baltimore the laughing stock of the country. This tax, if favored by the city authorities, will make four the owners of cars in Baltimore will have to pay. At present they pay \$20 for an owners' license, \$2 for an operator's license in addition to personal taxes to the city and state.

Making a Test Case—"For impeding traffic and creating a nuisance" three Philadelphia owners of cars placarded "To Hire" were arrested and fined for parking their cars in the street. The action has attracted considerable attention in view of the fact that counsel for the defendants brought up the point that taxicabs are permitted to stand on the thoroughfares without molestation and that discrimination was shown. Just how the taxicabs will be affected in the future will in all likelihood be brought up soon. There already is an edict from the department of public safety in effect prohibiting the parking of machines in the street for more than 1 hour at a time.

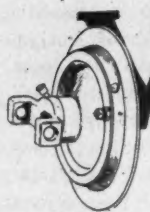
Salt Lake In—That the west and Utah in particular is thoroughly aroused over the good roads question and the possibilities of the transcontinental tourist question, was shown when a hundred or more representative Salt Lake business men met at the commercial club and organized the Salt Lake council of the Colorado-Utah link of the Midland trail. The Midland trail association was formed at Grand Junction about a month ago with the avowed purpose of placing the Midland trail in first-class condition for tourists. Under the scheme or organization each town along the route is forming a local council to solicit funds for road construction and upkeep and success is being had on every hand.

No. 8.—In Old Dominion



SAME ROAD 1 YEAR AFTER BEING IMPROVED

Velie 1913 Line Has Two New Models



VELIE CLUTCH
ADJUSTMENT

VELIE models for 1913 appear in three chassis types, designated model 40, model 32 and Velie Dispatch, respectively. The Velie 40, the leader of the line, is successor to this year's model M, and is now in its fourth season without radical

change in design of component parts.

The principal changes to be noticed in this car are the adoption of the Gray & Davis electric starting and lighting system. The drive on this model is on the left side, with the levers in the center. Silent chains have been substituted for gears in the timing drive, as shown in the illustration herewith. The magneto has been placed in a position where it is more accessible than formerly, as has the carburetor. The former is worm-driven on a cross shaft at the front of the motor, above the timing gear housing, while the latter is carried on the right side, above the water manifold, where it is well out of the muck, and may be reached for adjustment or inspection of the glass float chamber with facility. A patented clutch adjustment and an automatic gasoline pressure-feed are two of the detail refinements noticeable.

Dispatch One of the Models

The Velie Dispatch is a development of model 32, which is continued for the new season, with little change. The Dispatch motor is quite similar to that of the older model, excepting in detail refinements. The 32 shows practically no mechanical change from this year.

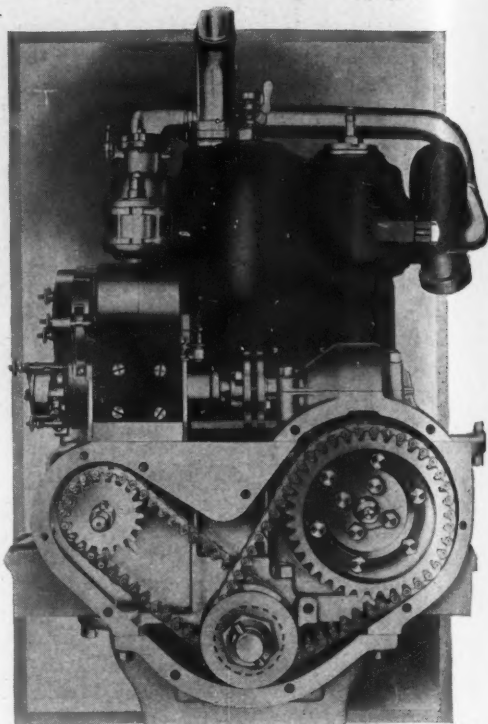
Returning to model 40; in detail the new motor is of four cylinders, cast in pairs,

with water jackets integral. The valves are all located on the left side, and operated by 1½-inch rollers on the push-rods from the single camshaft. Their mechanisms are inclosed in the cylinder castings, and covered by aluminum cover-plates secured by single studs and nuts at their centers. As in usual practice, the intake manifold leads to mutual inlet passages in each of the cylinder blocks. It is, however, of novel design, extending upwards from the valve-trunks in the form of an inverted Y, over the superimposed exhaust manifold, and over the motor to the right side, where it is connected to a Stromberg carburetor. The carburetor is of the concentric type, without water jackets.

Original Carburetor Mounting

The position of the carburetor is considerably higher than is usual, which makes it more accessible, and in addition raises it to a height where it is less likely to be drowned in fording streams, etc. This feature is doubtless the result of the recent experience of this car in the around Lake Michigan reliability. However, this raised carburetor position makes the gravity feed used on the model M impracticable, as the fuel has not sufficient drop to insure feed at high speeds or on grades. An automatic fuel-pressure system has been fitted to care for this, which consists of a small plunger pump operated from the camshaft, which maintains the pressure at 1 pound as long as the motor is running. The maximum pressure is 5 pounds, above which pressure the pump no longer retains its compression, the air passing around the piston.

Another pump maintains the oil-pressure for the circulating-splash system of lubrication. This pump is of the plunger type instead of the gear-pump used on model M.



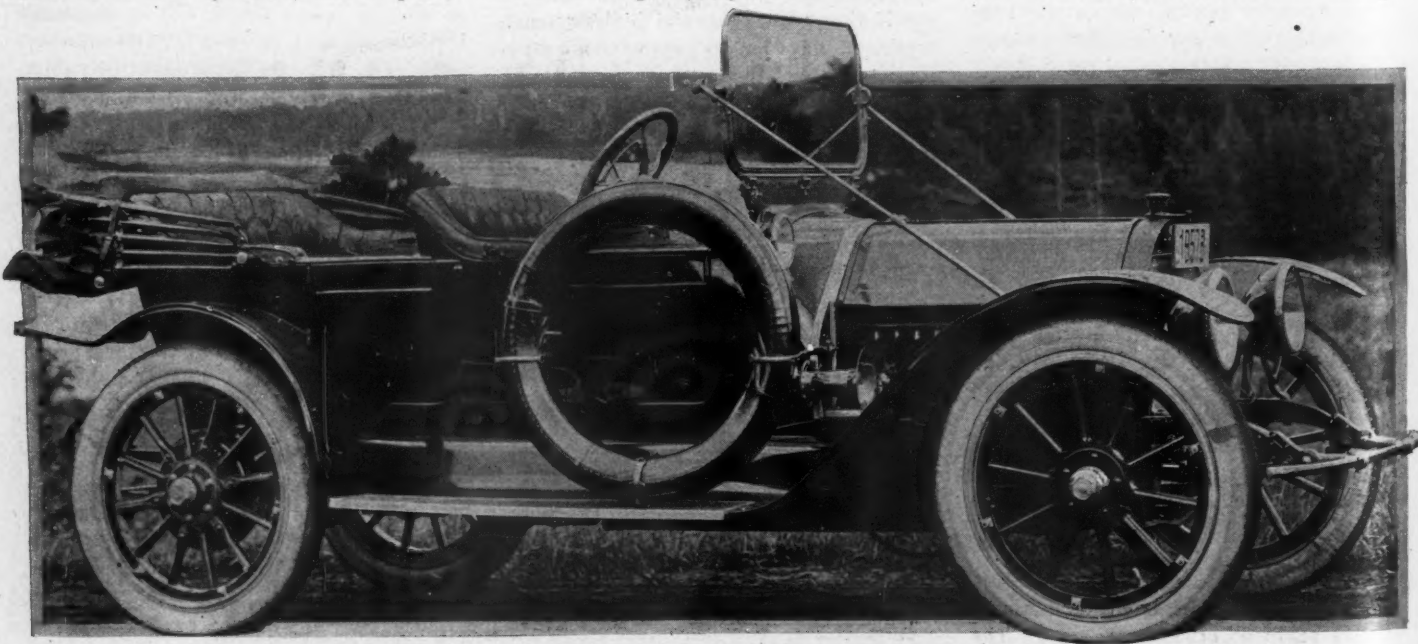
SOME VELIE FEATURES

Velie Timing Drive, New Intake Pipe and Carburetor Arrangement, and Transverse Magneto Drive

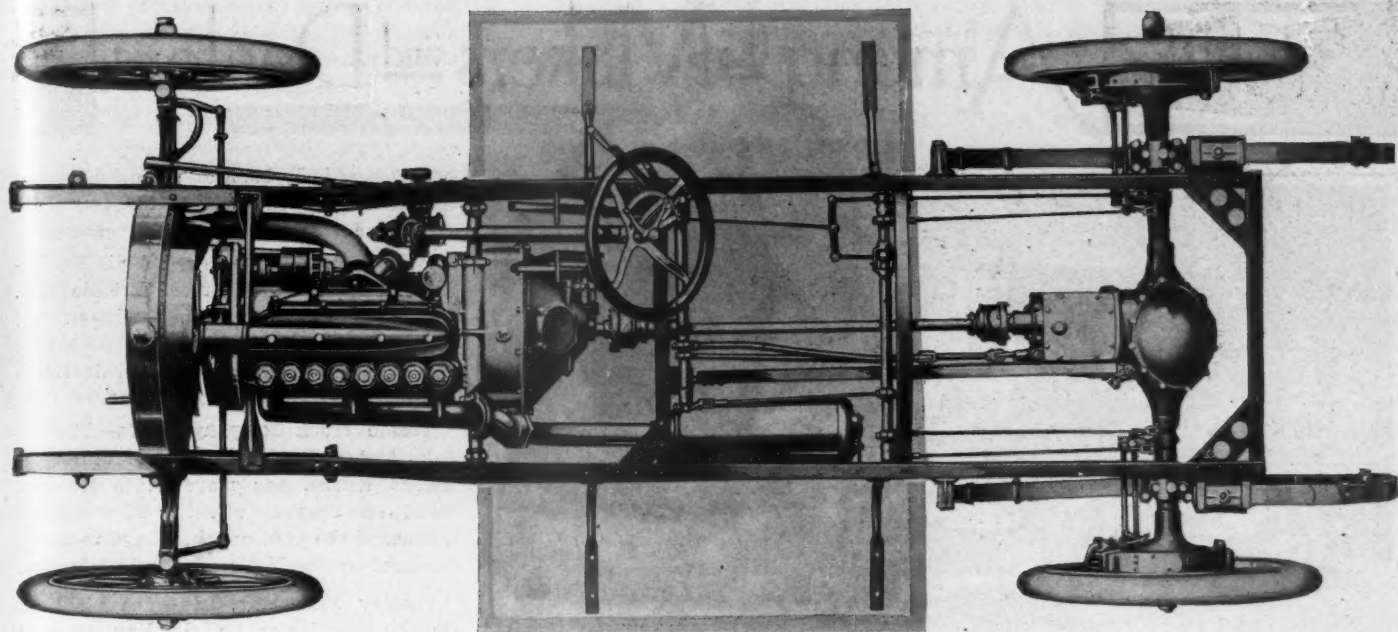
The oil is fed through the rear main bearing into the splash chamber, where it is maintained at a constant level, overflowing into the oil reservoir below. The other main bearings, there being three in all, the crank-pins, wrist pins, camshaft and cylinders are oiled by splash. The capacity of the system is 7 quarts.

Has Three Pumps

A third pump has been added to this motor, which was not used in model M. This is a centrifugal water pump, which forces the water from the radiator through



VELIE 40, FIVE-PASSENGER 1913 TOURING CAR



CHASSIS OF VELIE DISPATCH, NEW LIGHT FOUR FOR 1913

a Y-shaped water manifold to the bottoms of the cylinder jackets. Return is through the usual return pipe above the cylinders. The crankcase is of a copper-aluminum alloy, divided into two sections, the upper of which constitutes the engine base, and the lower the oil pan and reservoir. The motor is suspended from a channel-steel sub-frame by four integral arms on the upper half of the base. The drive-chains are inclosed in a housing at the front of the motor, closed by a single flat cover-plate. The radiator is of the flat-tube type, cooled by a belt-driven fan.

Accessible Magneto Mounting

The magneto is mounted in a most accessible position, crosswise, at the front of the motor, and is driven by a worm gear from the camshaft. It is of Bosch manufacture, of the high-tension dual type. All wires from the magneto are incased.

The clutch is of the dry-plate type, consisting of three plates, the second faced with Raybestos. A patented clutch adjustment is fitted, which is illustrated in the initial sketch. The clutch is included as a unit with the flywheel, the back-plate being threaded to the pressed-steel case. Turning this plate upon its threads brings the disks closer or farther apart, the adjustment, when made, being locked by two set-screws, fitted with lock-nuts. The gear-set is located amidships, on the subframe. It provides three speeds forward, and one reverse, on the selective plan, and is mounted on Timken roller bearings. Two Spicer universal joints are fitted in the drive-shaft. The rear axle is a full-floating Timken, with a bevel-gear differential. Propulsion is through a heavy pressed steel torque arm, cushioned on a cross member by two large springs. The front axle is of the I-beam type, fitted with Timken bearings, semi-elliptic springs supporting the frame in front, and three-quarters scroll elliptics at the rear. The rear springs are 54 inches long. Service

brakes are external contracting on the rear wheels, and the emergency brakes expand on the same drums. Both are operated by standard control.

Left Hand Drive

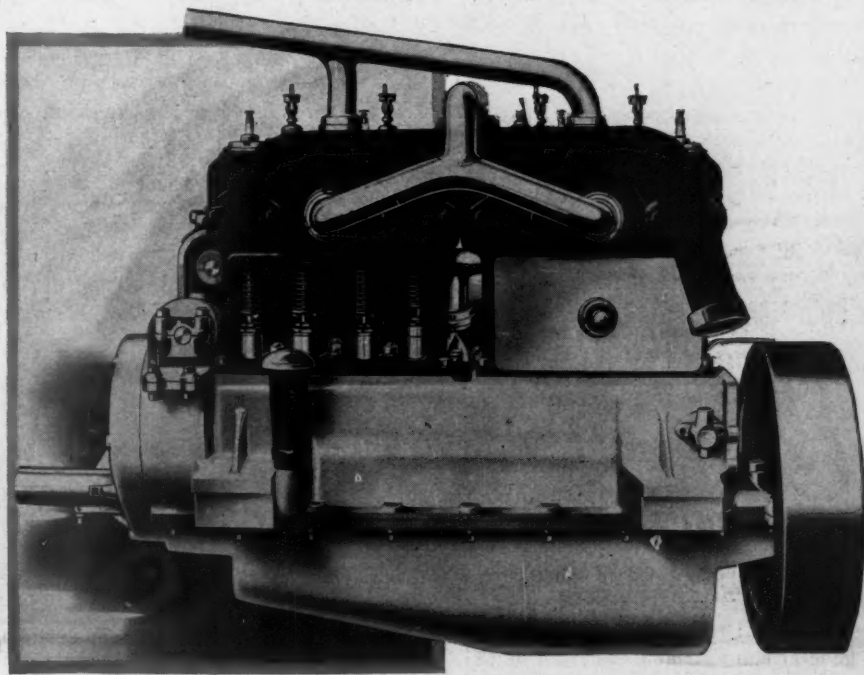
Steering is by a worm-and-sector gear, with the 17-inch hand wheel on the left side of the car. The control is in the center of the car, to the driver's right. Electric starting is the feature of the equipment of this model. The Gray & Davis starting motor is fitted, in addition to the Gray & Davis generator, for lighting. This system has been described in *Motor Age* in several previous issues. The generator is driven from the water pump shaft, while the starting motor is geared to the flywheel. A 120 ampere-hour storage battery is included in this equipment, which supplies five lamps. Other equipment includes a mohair top and envel-

ope, windshield, speedometer, demountable rims, with one spare, and an electric horn.

The bodies fitted to this model are a five-passenger touring car, a four-passenger phaeton, and a seven-passenger limousine. The upholstery on all models is 10 inches deep. The wheelbase is 118 inches; tread, 56 or 60 on option; tires, 36 by 4 inches, on touring car and four-passenger, and 37 by 4½ on the seven-passenger limousine.

The Little Fellow

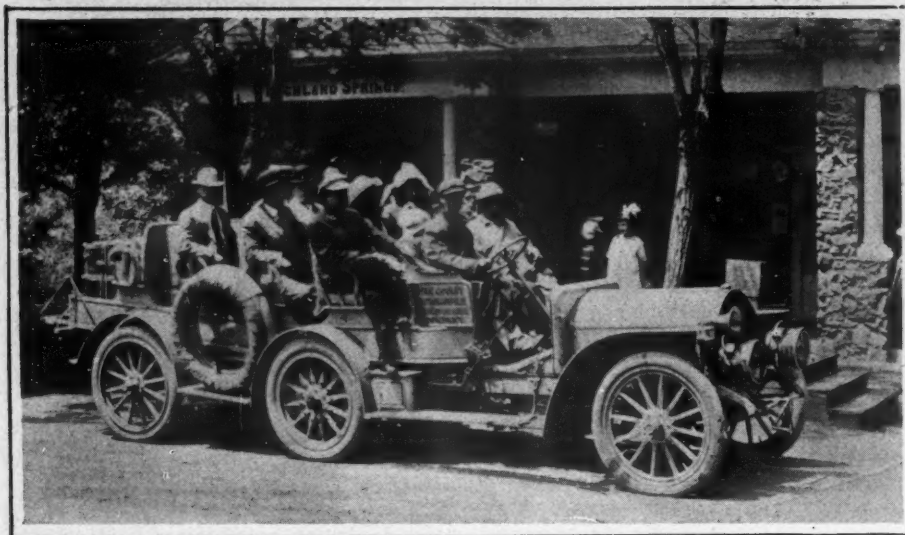
The Dispatch model is built along the same lines as the larger car, differing mainly in size, and the following particulars: The motor is cast in bloc, the gearset is located on the rear axle, the tires are 34 by 4, the cooling is by thermo-syphon, the gasoline feed is by gravity, no torque arm is fitted, propulsion being taken through the springs, and the rear axle is semi-floating, mounted on Hyatt bearings.



VALVE SIDE OF VELIE 40 MOTOR, SHOWING NOVEL INTAKE MANIFOLD



Among the Makers and Dealers



COLUMBIA SIX-WHEELER USED AS A RUBBERNECK COACH

ADDS TO Factory Room—The Ward-Leonard Electric Co., Bronxville, N. Y., has quadrupled the floor space in its factory devoted to electric dynamo lighting systems and starting systems.

Arthur Goes with Croxton—B. D. Arthur, formerly western sales manager for the Ohio Motor Car Co., Cincinnati, O., has been made vice-president and general sales manager of the Croxton Motor Car Co., of Washington, Pa.

Four-Wheel Drive Prosperity—The Four-wheel Drive Automobile Co., Clintonville, Wis., manufacturing the Four-Wheel Drive commercial and pleasure cars, has increased its capital stock from \$110,000 to \$250,000, to provide for the expansion planned some time ago.

Reddig Goes to Detroit—Announcement is made that C. E. Reddig, chief engineer of the Columbia Motor Car Co. and designer of the Columbia-Knight car, has resigned his position with that company, and has been made assistant chief engineer of the Timken-Detroit Axle Co., with headquarters in Detroit.

New Radiator Concern—With a capital of \$30,000, which soon will be increased to \$125,000, former employees of the Briscoe Mfg. Co., and others, have organized the Farlinger Mfg. Co. for the purpose of placing on the market a new radiator, the invention of George E. Farlinger, of Detroit, for many years superintendent for the Briscoe company. The plant of the Waterman Marine Motor Co., 1506-12 West Fort street, has been leased. The officers of the new company are: President, George E. Farlinger; vice-president, Otto J. Groehn; secretary, William H. Arthur, Marshall, Mich.; treasurer, Charles R. Talbot; general manager and chairman of the board, Frederick C. Arthur; directors, the

officers and Maurice Friedburg and Alex. J. Ranstadler. The new radiator is of the honeycomb type and has only twenty-five pieces of metal. The radiator proper is a series of hollow plates which may be standardized and made interchangeable.

Eldredge Forms a Company—W. E. Eldredge, who has the Boston agency for Couple Gear trucks, has just formed a company to manufacture motor vehicles. It has been incorporated under Massachusetts laws. Mr. Eldredge is not yet ready to announce what he proposes to build.

Oil Suit Decided—James D. Berry & Co., owners of oil wells at Oil City, Pa., won a suit for \$4,565 against the Wahdams Oil Co., of Milwaukee, a large independent distributor of motor oils, gasoline and petroleum products, in the Milwaukee courts last week. The Berry concern sued for the purchase price of three tanks of crude oil shipped to the Wahdams company and refused by it because, it was alleged, of a decline in the market.

Columbia Six-Wheel Mountain Bus—Unique among the many schemes to adopt motor cars to different lines of work is a six-wheel fourteen-passenger sightseer, built by the Lake County Automobile Transportation Co., Highland Springs, Cal., and employing a Columbia car that is 7 years old. The problem of bus work and hotel transportation between railroads and resorts in the mountains is one of carrying large parties with few conveyances. These machines must be capable of making extremely sharp turns and the usual four-wheel bus of long wheelbase finds difficulty in negotiating some of the tortuous mountain roads. To obviate this difficulty the Highland Springs company added two wheels and a new body to the Columbia chassis, hinging the forward end

of the new body back of the driver's seat and arranging the wheels to steer both front and rear.

Briscoe Promotions—Fred Aldis has become superintendent for the Briscoe Mfg. Co. to succeed George E. Farlinger. Ed Robinson succeeds Frederick C. Arthur in the sales department. Both appointments are in the nature of promotions.

Toledo Truck Company Moves—The Toledo Motor Truck Co., manufacturer of Toledo trucks, has moved into its new plant on Spencer street. The concern purchased the land and buildings formerly occupied by the McCreery Engineering Co.

Findlay Plant for Sale—The plant of the Findlay Motor Co., Findlay, O., will again be offered for sale Thursday, January 16, under an order of the United States court at Toledo. The sale is to be in charge of Fred H. Kruse, of Toledo, named as special master commissioner. The plant is to be sold as a whole for not less than \$50,000. It is believed that about \$200,000 has been sunk in the concern.

Drawback Allowed—The treasury department at Washington has issued a proclamation to the effect that drawback will be allowed under section 25 of the tariff act of 1909, the rules promulgated thereunder on motor car transmission gears manufactured by the Muncie Gear Works, Muncie, Ind., with the use of imported ball bearings. The drawback allowance shall not exceed the number of ball bearings used as shown by the manufacturers' sworn statement filed with the collector of customs at New York.

To Make Gray Starter—The Gray Engine Starter Co. has been organized in Indianapolis and will be a holding company for the patent rights of an invention of Thomas J. Gray on a self-starting device, the right to manufacture which has been let to the Gray & Davis company, of Boston, a branch of the General Electric Co. The Indianapolis company has been incorporated with an authorized capitalization of \$300,000, the directors and principal stockholders being Mr. Gray, William Bosson and Dr. Robert C. Light, all of Indianapolis.

Big Cadillac Convention—The convention of Cadillac dealers in Detroit came to a close with a big banquet at the Ponchartrain hotel at which K. P. Drysdale, advertising manager of the Cadillac company, was toastmaster. During the 4 days' sessions, which were held at the Ponchartrain points of general interest along the lines of salesmanship were discussed and especially plans for service to the owner. Trips through the factory were arranged for the dealers in small parties. About 250 dealers were in attendance,

about 200 of these being dealers and the other men connected with the various agencies, all parts of the United States and Canada being represented.

Big Tire Production—During the first week in December the Goodyear Tire and Rubber Co. turned out 5,200 motor car tires in 1 day which is claimed as a record.

Gleeson Murphy Resigns—After having filled the position of assistant to President Neal of the General Motors Co. for 2 years, Gleeson Murphy has resigned and has opened an office in the Boyer-Campbell building, where the offices of General Motors are located, to represent the H. K. McCann Co., advertising, of New York.

New Packard Name Plate—A new Packard name plate is being used that contains the patent numbers and dates of all inventions embodied in the car. The company has gone to some pains to comply with the law in this respect and still keep the list within reasonable space. There are 131 patent numbers and dates under the heading "owner of patents" and twelve patent numbers and dates under the heading "licensed under patents."

New Cleveland Concern—The Davies-Bach Mfg. Co., of Cleveland, has been organized and incorporated under the laws of Ohio, and with its factories located at Alliance. The factories are equipped with modern machinery for the manufacture of motor car parts and light and heavy steel stampings. The company has acquired 17 acres of land on the main line of the Pennsylvania railroad at Alliance and has already erected three buildings on this site. Plants Nos. 1 and 3 are each 52 by 206 feet, and plant No. 2 is 53 by 206 feet. The officers are: President,

C. H. Davies; vice-president and secretary-treasurer, J. J. Schmitt; George R. Nash, C. F. Bach and W. F. Schmitt, directors; John Hughes, superintendent.

Holley Branch in England—The Holley Brothers Co. has established a branch in England at 46 Northumberland road, Coventry, where all sizes of Holley carbureters and parts are carried in stock.

Coburn Succeeds Brandt—The advancement of Ernest Brandt, who had charge of the United Motors Boston Co., to the position vacated by the resignation of Alfred Reeves in the United States Motors Co., left the position of manager of the New England district open and Ralph Coburn, who had charge of the Boston office for some time, has been advanced to Mr. Brandt's place.

Guide Company's New Factory—The Guide Motor Lamp Co., making electric lamps and fittings exclusively, has outgrown its present factory and facilities and is erecting and will soon move into a modern factory building occupying the entire block between One Hundred and Fourteenth and One Hundred and Fifteenth streets, Madison avenue, Cleveland. The new building gives the Guide company 14,000 square feet of floor space.

Indianapolis S. A. E. Meets—The first meeting of the winter of the Indiana branch of the Society of Automobile Engineers was held in Indianapolis December 5, the principal speaker being E. B. Van Wagner, of the Van Wagner Die Casting Co., of Syracuse, N. Y., whose subject was white metals for motor car bearings. In the discussion that followed the paper was discussed in an able manner by W. G. Wall, of the National Mo-

tor Vehicle Co.; Howard Marmon, of the Nordyke & Marmon Co., and John G. Wood, of the Indiana Die Casting Development Co.

New Colby Manager Named—F. P. Steinhauer, for the past 2 years district sales manager of the Abbott-Detroit line in the states of Iowa, Nebraska and part of Illinois, has resigned his position to become general sales manager of the Colby Motor Co., at Mason City.

Oshkosh Re-elects Crum—Dr. A. J. Crum has been re-elected president of the Oshkosh Automobile Dealers' Association of Oshkosh, Wis. F. S. Hoaglin was elected vice-president; A. H. Thom, secretary, and W. F. Scoular, treasurer. Definite dates have not been selected for the annual show, but will be taken from the month of February.

Big Fire at Westfield, Mass.—In a fire at Westfield, Mass., a few nights ago the Elm garage, owned by Byers & Lay, was destroyed, together with twenty-two motor cars that were stored in the building, and the loss is estimated at \$50,000. Eleven of the cars were owned by the firm and used for renting purposes, the others being owned by residents of Westfield and nearby towns.

Spitzley and Bush Out—B. C. Spitzley, general manager, and W. T. Bush, general sales manager, have resigned their connection with the Abbott Motor Co., according to a report which has been confirmed. No statement has been given out by either of the officials and no inkling as to their plans for the future has been given to the public. Mr. Spitzley has just returned from a western trip for the company.



NEW YORK SECTION OF S. A. E. GIVES BEEFSTEAK DINNER

Development Briefs in Accessory Field

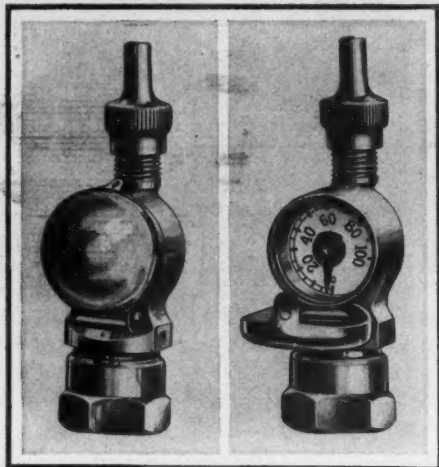


FIG. 1—STAY-ON TIRE GAUGE

Stay-On Tire Gauges

IMPORTANT as the use of tire gauges to ascertain definitely the exact pressure carried in a tire at all times is recognized to be, many motorists still rely on the feel or appearance of an inflated tire to guide them. Perhaps one reason for this is the absence heretofore of such a device as the Stay-On tire gauge. This contrivance is a pressure gauge, operating on the Bourdon tube principle, like steam gauges, which is incorporated in the same casing as a standard Schrader valve. The valve portion is threaded to be screwed on the valve stem of the inner tube, after the regular valve-core has been removed, and carries the usual valve-cap. The dial is covered by a small hinged lid, provided with a spring latch to keep it closed. No rubber is used in them, with the exception of the Schrader valve-core. It is claimed that this is the smallest gauge made using the Bourdon tube.

Firestone Tire for Electrics

At the recent Firestone salesmen's conference, a new type of cushion tire was discussed. This tire was especially designed for electric vehicle use. Experience has shown that tires are an important element

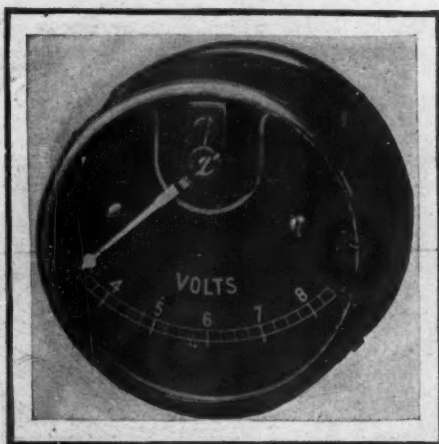


FIG. 2—WESTINGHOUSE VOLTMETER

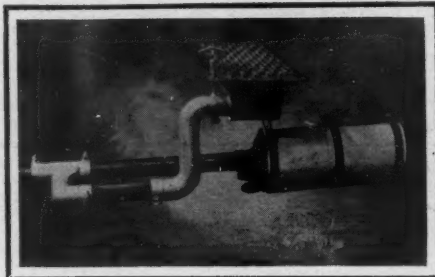


FIG. 3—GARRISON EXHAUST HEATER

for consideration in the maintenance of batteries, that wide tires consume more current than narrow ones, and that narrow ones induce losses through friction. That the mean between these two is the essential size has been recognized, and the problem of the tire builder is therefore how to produce a tire of sufficient resilience with this restricted surface. The Firestone Tire and Rubber Co., has offered the tire shown in Fig. 8 as its solution of the problem. As will be seen, this tire is of the dual tread base-wire type. This gives it its resilience, as the treads spread under shock, and bend in on the under-cut sides of the tire. The bead is made to fit all standard clincher rims, interchangeable with pneumatic tires.

Garrison Motor Car Heater

To keep the car warm in cold weather, utilizing the heat of the exhaust, which would otherwise be lost, is the purpose of the Garrison motor car heater, Garrison Gasoline Engine Specialties Co., Philadelphia, Pa. This heater, Fig. 3, consists of a T-union which is inserted in the exhaust line, which connects through a pipe with a gas radiator, installed in the floor of the car, with the radiating plate flush with the top. The heater is in substance a muffler, which breaks up the gases, silences them, and dispenses their heat through the radiating surface at the top, ejecting the cooled and broken gases through an outlet at the rear. It is said that little more back-pressure is offered by this device than with the ordinary muffler, and that it is an efficient silencer.

Westinghouse Motor Car Meters

For use on motor cars, a new line of meters has been produced by the Westinghouse Electric and Mfg. Co., Pittsburgh, Pa. These meters, of which that shown in Fig. 2 is typical, are unusually compact and neat in appearance. That shown in the illustration is but 3 inches in diameter, with a scale of etched metal, and can be furnished in cases of either dull black, polished nickel or polished brass. The advantages of a black dial, with white letters are evident as not only are the calibrations rendered more legible, but the glare incident to white scales is eliminated. This is especially true in night driving. These meters are made in round



FIG. 4—ACKERMAN WINDSHIELD

dial forms, flush, non-flush and on an upward angle, facilitating reading. This latter form is provided with a concealed lamp which illuminates only the dial and cannot itself be seen.

The meters are of the moving coil and permanent magneto type, which is said to render them free from residual errors, and free from vibration. They are constructed with especial attention to light weight and wearing qualities, the pointer being made of aluminum for this purpose. This allows of a light counterweight, resulting in less wear on the bearings. The instrument is readily accessible for repairs. In the ammeter, zero is in the center, the reading being on one side or the other, according to the direction of the current. The volt-meters are without a zero, to permit of wide calibrations, permitting accuracy of reading at the 5-volt point, which is the most used in motor car use.

Ackerman Ventilating Windshield

Joseph N. Smith & Co., Detroit, have produced a ventilating windshield for the purpose of providing a draught of air through the front compartment of a fore-door car, shielding the driver at the same time from the direct blast in his face.

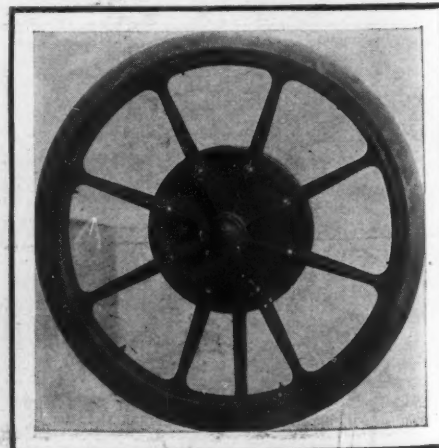


FIG. 5—SHELDON STEEL TRUCK WHEEL

Novelties for Use of the Motoring Public

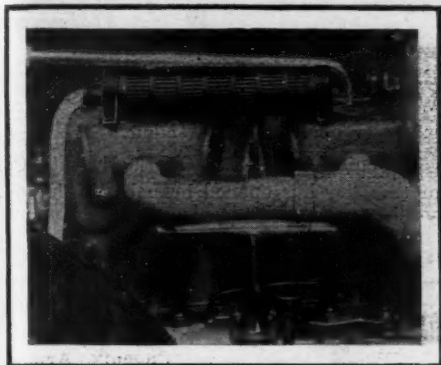


FIG. 6—CONSOLIDATED MOTOR WARMER

The shield is shown in ventilating position in Fig. 4. It consists of two panes of glass, an upper and a lower. The lower portion is framed with brass and is hung on two pivots at its upper edge. These joints are of the friction type and may be locked in any position. The mounting of the joints is stationary, being supported by two vertical legs and braces. The upper pane is pivoted slightly above its middle to a pair of swinging arms. These arms are in turn pivoted on the main friction joint, and are adjustable to any angle. The pivots on which the upper pane is hung are also of the friction type. The lower joints are adjustable for tension by a pair of wing-nuts. The construction is of metal and glass throughout, and the shields are finished in black and nickel, black and brass, full polished nickel or full brass.

Crary Gasoline Lock

Featuring a flexible connection between the lock portion and the valve portion of the device, the Crary gasoline lock, Fig. 7, is produced by the Crary Gasoline Lock Co., Detroit, Mich. The lock consists of a valve in the gasoline feed pipe, between the carburetor and the fuel tank, which is operated by a flexible shaft, disposed in a flexible tube. This shaft and tube terminate in a brass or nickel plate on the dash, which is fitted with an oper-

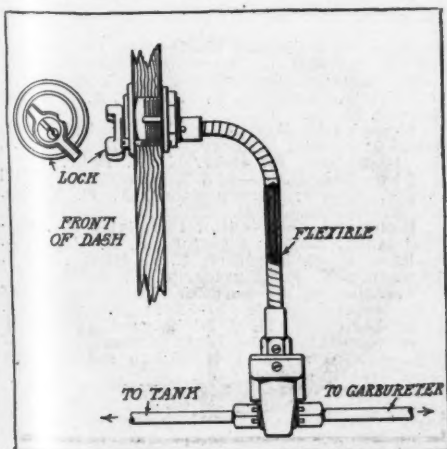


FIG. 7—CRARY GASOLINE LOCK

ating lever. This lever operates the latch of a Yale pin-tumbler lock. When the key is inserted the lever may be turned either way, but with it withdrawn it may only be turned to the off position. The advantages claimed for the flexible connection are two-fold. In the first place, the tube may be bent as desired, accommodating the device to any form of installation. Another feature of more importance, as advanced by the manufacturers, is the fact that owing to its flexibility there is less likelihood of injury to the gasoline line than were it to be made rigid.

Sheldon Steel Wheels

Believing, after a study of the situation, that wood wheels are unadapted to the punishment imposed upon them by heavy motor trucks on the rough pavements and roads to be encountered in this country, the Sheldon Axle Co., Wilkes-Barre, Pa., have produced a line of steel truck wheels, a type of which is shown in Fig. 5. The reasons ascribed for the superiority of steel construction over wood are that whereas wood wheels must be made of a great many separate pieces of wood, joined by mechanical means at the hub, with material granted equally strong for bulk and weight, the strength of the wheel would not be as great as that of a wheel constructed in one piece, with spokes, hub and felloe integral. That steel may be moulded to exactly the most advantageous form to meet with the strains to be imposed, while wood may be cut in this manner to only a limited extent. That steel is capable of withstanding far more strain for a given size than wood, and yet, owing to its adaptability to scientific forming, may be made lighter for its strength.

It is claimed also that owing to their true form, immunity to conditions that warp wood wheels and the radiating qualities of thin steel, steel wheels are more economical of tires than wooden ones.

Leak-Proof Piston Rings

Somewhat elaborate in design, although simple in construction, the piston rings shown in Fig. 9 are the product of the McQuay-Norris Mfg. Co., St. Louis, Mo. Leak-Proof rings, as they are styled are of two piece construction, made of gray iron. The two halves, when fitted, form a complete ring, flexible but possessing no open joints. The junction is in the form of a step and is on an oblique plane, so the point of expansion on each piece is opposite that of the other, making the pressure equal all around. The split on each ring-section is on an angle, these openings being on opposite sides of the ring, and in the heaviest portion of each section. The value of efficient rings is of course in maintaining compression under all conditions, without undue ring-pres-

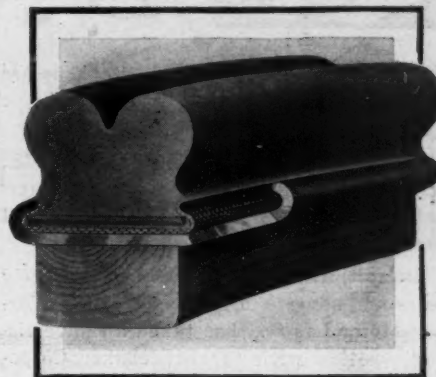


FIG. 8—FIRESTONE ELECTRIC TIRE

sure, and the prevention of carbonization by keeping oil in excess of what is required for actual lubrication from entering the cylinder.

Consolidated Motor Heater

To take the place of anti-freeze solutions and obviate the necessity for heating the garage, or drawing off the water at night, the motor warmer shown in Fig. 6 has been placed on the market by the Consolidated Car-Heating Co., New York. The heater is electric, similar to those used on electric railways, and is simply placed within the hood on garaging the car, and the current turned on. Current is supplied from the regular lighting circuit, through a plug which screws into a standard lamp socket. The heaters are made for 110 volts, either A. C. or D. C., and are said to cost but a cent an hour to operate. It may be used also to warm the interior of a closed car in the cold months while waiting. The heater is useful in the house as well as in the garage.

Wrong Illustration Used

The clip illustrated in Fig. 2, in the issue of Motor Age of November 28, in connection with the description of Woodworth Treads, was inserted by mistake, as it is not a feature of the product of the Leather Tire Goods Co., of Niagara, Falls, N. Y.

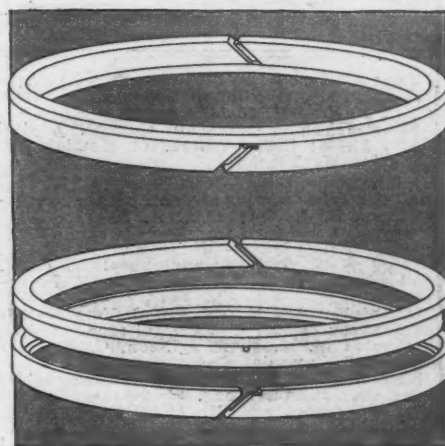


FIG. 9—LEAK-PROOF RINGS



Brief Business Announcements



LONG BEACH, Cal.—T. A. Stephens has started work on a two-story brick garage at 212 Locust street.

Columbus, O.—The Johnston Sales Co., agent for the R. C. H., has opened a new salesroom and garage at 115 North Wall street.

Detroit, Mich.—G. L. Willman, formerly sales and advertising manager of the Warren Motor Car Co., has taken an advertising position with the Studebaker Corporation.

Washington, D. C.—F. W. Powers, manager of the Goodyear Tire and Rubber Co.'s branch, has been promoted to the managership of the Philadelphia branch. His successor here has not yet been appointed.

New York—A. J. Fisk, formerly general manager of the Witherbee Storage Battery Co., and at present western sales manager for A. R. Mosler & Co., will represent the Ward-Leonard Electric Co., of Bronxville, New York, in the sale of automatic dynamo-lighting and self-starting systems.

St. Paul, Minn.—The Electric Mfg. Co., 353 Minnesota street, has enlarged its official force and increased the capital to \$50,000. It will take possession of a new two-story building, 50 by 150 feet, February 1, and will carry a new line of supplies, in addition to taking the local agency for the Federal tires.

Dallas, Tex.—The Southwestern Motor Sales Co. has opened one of the largest sales agencies in the southwest and is handling the Lozier, Speedwell, Staver, Chevrolet and the Little lines in Texas and the southwest. The Southwestern Motor Sales Co. was organized about 60 days ago with an authorized capital of \$200,000, with principal office at Dallas, Tex., and is officered as follows: Louis A. Boli, Jr., president and general manager; C. Charles Jones, vice-president; Martin A. Seward, vice-president; Nathan

Jersey City, N. J.—Miller Supply Co., capital stock, \$100,000; incorporators, J. A. Duffy, W. C. Marley, M. E. Thornton.

Minneapolis, N. Y.—Nassau Garage, capital stock, \$1,000; incorporators, C. Kemlein, F. Kemlein, M. Kemlein.

Minneapolis, Minn.—Northwestern Tire Co., capital stock, \$50,000; to deal in tires; incorporators, F. J. Kerner, A. A. Kerner, J. C. Roney.

Minneapolis, Minn.—Michaelson Motor Co., capital stock, \$200,000; incorporators, J. M. Michaelson, W. E. Michaelson, A. E. Peterson.

Mount Vernon, N. Y.—Mount Vernon Motor Express & Van Co., capital stock, \$6,000; incorporators, M. R. Fitzgibbon, C. C. Fitzgibbon, S. Laverde.

New York—Durable Tread & Automobile Sales Co., capital stock, \$10,000; to deal in tires; incorporators, R. H. Jacobs, S. M. Winkler, H. A. Deimel.

New York—American Chain Co., capital stock, \$750,000; to manufacture non-skid tire chains; incorporators, W. B. Lasher, W. W. Wheeler, F. T. Staples.

Recent Incorporations

Albany, N. Y.—Kenmore Garage Co., capital stock \$1,000; incorporators, M. T. Adams, G. Keeler, W. L. Hill.

Boston, Mass.—F. A. Dutton Motor Co., capital stock, \$25,000; incorporators, F. A. Dutton, C. A. Farnsworth, J. Smith.

Boston, Mass.—Motor Supply Shop, capital stock, \$25,000; to deal in motor car supplies; incorporators, M. V. O'Neill, W. R. McDaniel, J. M. Hall.

Brookline, Mass.—Simplex Automobile Agency, capital stock \$30,000; directors, H. A. Clapp, H. McCaffrey, F. O. White.

Brooklyn, N. Y.—Mel Stringer's Garage; capital stock, \$10,000; to deal in motor cars; incorporators, F. R. Huntington, M. Stringer, J. Culleney.

Brooklyn, N. Y.—Prospect Park South Garage, capital stock, \$5,000; incorporators, D. Rathbun, A. M. Hicks, S. Plunkett.

Brooklyn, N. J.—American National Motor Bus Co., capital stock, \$1,000,000; incorporators, C. A. Clarke, S. L. Conklin, J. A. Satterfield.

Buffalo, N. Y.—Regal Distributors, capital stock, \$15,000; incorporators, C. A. Hallton, G. Bullis, S. F. Carr.

Buffalo, N. Y.—Buffalo Automobile Sales Corp., capital stock, \$15,000; incorporators, W. J. Harris, W. U. Heverly, M. MacDonald.

Buffalo, N. Y.—Glide Sales Co., capital stock, \$10,000; to deal in motor cars; incorporators, J. F. Lynch, L. P. Fuhrmann, E. T. Danahy.

Buffalo, N. Y.—Marvel Motor Car Co., capital stock, \$25,000; incorporators, M. B. Franklin, G. B. Klein, H. Kleinhaus.

Catskill, N. Y.—Peerless Garage Corp., capital stock, \$8,000; incorporators, J. A. Hill, C. R. Vermilyea, S. W. Hill, A. G. Vermilyea.

Chicago—Lakeside Motor Truck Transportation Co., capital stock \$25,000; motor transportation business; incorporators, E. P. Dunlap, J. M. Dunlap, E. W. Macavoy.

Cleveland, O.—Marvel Auto Supply Co., capital stock, \$5,000; to manufacture motor car accessories; incorporators, J. B. Rosenstein, H. L. Armstrong, M. L. Rosenstein, S. I. Rose, M. L. Fouts.

Cleveland, O.—Oldsmobile Co., capital stock, \$50,000; to manufacture motor cars; incorporators, P. D. Metzger, C. H. Davis, J. J. Schmidt, C. L. Lampus, C. O. Nelson.

Cleveland, O.—Republic Electric Co., capital stock, \$10,000; to manufacture and deal in electric machinery; incorporators, L. Griesser, O. S. Mann, G. S. Peskind, E. Marte, G. E. Mann.

Cleveland, O.—Pisco Mfg. Co., capital stock, \$15,000; to manufacture lamps and motor car specialties; incorporators, H. G. Smith, J. C. Hipp, T. J. Smith, T. Lanness, D. Pfahl.

Cleveland, O.—Sixth City Machine Co., capital stock \$10,000; to manufacture and deal in motor cars; incorporators, Ray C. Skeel, Charles M. Ringle, C. F. Bruggemeier, E. M. Becker, A. F. Goldenbogen.

Columbus, O.—Johnson Sales Co., capital stock \$10,000; general motor car business; incorporators, W. J. Bennett, J. U. Pelton, A. D. Yeiser, M. M. Johnston, J. M. Bennett.

Columbus, O.—Fresco Mfg. Co., capital stock, \$15,000; to make and sell motor car lamps; incorporators, H. C. Smith, J. C. Hipp, T. J. Smith, T. Lanness, D. Pfahl.

Detroit, Mich.—Farlinger Mfg. Co., capital stock, \$30,000; to manufacture motor car accessories; incorporators, M. Friedburg, C. R. Talbot, W. H. Arthur.

Detroit, Mich.—Kessler Detroit Motor Car Co., capital stock, \$10,000; to manufacture motor cars and accessories; incorporators, H. C. Brooks, Jr., R. McCormick.

Detroit, Mich.—Superior Motor Co., capital stock, \$100,000; incorporators, H. Fraser, W. C. Schneider, G. C. Brimmer.

Des Moines, Ia.—Des Moines Motor Co., capital stock, \$25,000; to deal in motor cars; incorporators, F. H. Hunter and C. F. Schee.

Harrisonburg, Va.—Harrisonburg Garage, capital stock, \$25,000; incorporators, J. J. Hawse, H. L. Furn.

Hudson Falls, N. Y.—Kingsbury Motor Sales Co., capital stock, \$10,000; to deal in motor cars; incorporators, L. Wetsell, E. H. Wells, E. I. Wells.

Indianapolis, Ind.—Tone Car Corp., capital stock, \$200,000; to build motor cars; incorporators, F. J. Tone, M. H. Miller, W. P. Kirk.

Indianapolis, Ind.—Premier Agency Co., capital stock, \$30,000; directors, V. C. Vette, D. E. Sherrick, T. H. Adams, W. H. Foreman, H. W. Cowper.

E. Jones, treasurer and purchasing agent; Walter L. Marsh, secretary; C. R. Jones, manager of truck department.

Phoenix, Ariz.—The Overland Auto Co. of this city has opened branches in Tucson, Yuma and Kingman.

Davenport, Iowa—Henry Jaeger has opened a garage opposite the New Kimball hotel on Fourth street. No agency has yet been announced.

Spokane, Wash.—The Spokane Auto-Truck Co. has opened a garage under the management of W. P. Greenough at 1212 Second avenue.

Detroit, Mich.—Alfred A. Greenburg, secretary of the Detroit section of the Society of Automobile Engineers, has undertaken the sales representation in this city of the products of the Baltimore Tube Co.

Los Angeles, Cal.—A contract has been awarded by the Ford Motor Co. for the erection of a reinforced concrete service building to cost \$200,000. The building will be erected at Santa Fe avenue and East Seventh.

Lansing, Mich.—Henry Neller has purchased land on Turner street upon which he will erect a garage for A. S. Bennett and William Neller, who will conduct a general repair business, together with selling accessories. Mr. Bennett will continue the sale of the Krit cars. The garage will be two stories in height.

Washington, D. C.—The United Motor Washington Co., a branch of the United States Motor Co., has been dissolved, the Maxwell agency being given to H. B. Leary, Jr., and the Columbia to the Dupont Garage Co. Leary has leased the company's salesroom and the Dupont company has taken Leary's old quarters at 1317 Fourteenth street, N. W. The latter also handles the Rambler and Mitchell. John R. Thomas, former manager of the United Motor Washington Co., has been promoted

New York—Motor Mechanism Co., capital stock, \$25,000; to manufacture motor cars and parts; incorporators, E. Younger, F. Castle, H. C. Evans, E. E. Gray, S. E. Sackerman.

New York—Garron & Co., capital stock, \$20,000; to deal in motor cars; incorporators, A. L. Garron, H. Behr, K. H. Behr.

Richmond, N. Y.—K & K Motor Co., capital stock, \$10,000; incorporators, A. E. Killian, F. B. Killian, L. E. Killian.

Richmond, Ind.—Pitlot Car Sales Co., capital stock, \$50,000; directors, J. E. Hayes, A. Schaefer, H. E. Bradford, C. E. Hayes, W. D. Williams, E. F. Goggins, T. F. Williams.

Trenton, N. J.—Lord Baltimore Motor Car Co., capital stock, \$100,000; incorporators, John Luntz, Jr., H. C. Nicholas, J. L. Conard.

Wilmington, Del.—Light Commercial Car Co., capital stock, \$100,000; to manufacture and deal in motor cars.

Worcester, Mass.—Dixon, Walsh & Nicholson Co., capital stock, \$1,000; to repair motor cars; incorporators, W. T. Walsh, A. P. Nicholson, J. Clark, Jr.

Worcester, Mass.—Slattery Brothers Automobile Co., capital stock, \$10,000; directors, W. J. Slattery, M. J. McCoy, J. McSlattery.

to the managership of the Philadelphia branch.

Des Moines, Ia.—C. W. Bopp, formerly of Hawkeye, Ia., has opened a new sales room in Des Moines for the Nyberg.

Washington, D. C.—Frank W. Robartes has been appointed resident manager of the Washington branch of the Locomobile Co. of America.

Seattle, Wash.—A new firm has been added to Seattle's row, namely, the Auto-parts Supply Co., at 702 East Pike street. E. L. Hawkes is president and manager.

Portland, Ore.—A. G. Annesley is the new manager of the Diamond Rubber Co. in Portland, Ore., having recently been promoted from the San Francisco branch.

Toledo, O.—The Rapp Mfg. Co. maker of the Viso spark plug, will double its capacity about the middle of December. It will remove from the Snowflake building to the new Factories building where it will utilize more than 2,000 feet of floor space. The concern has been in existence but 4 months.

Dayton, O.—J. W. Woodruff and R. W. Kuhns, formerly associated with the Peckham Motor Car Co., have resigned, and have taken the agency for the Wagenhals delivery car, controlling the central western section of Ohio, and will be known as the Kuhns-Woodruff Co., located at 435 and 437 East First street, Dayton, O.

Indianapolis, Ind.—Warren D. Oakes has become associated with his brother, Will H. Oakes, in the manufacture of radiator fans in Indianapolis. The business of the Oakes company has been increasing so rapidly that this expansion has been necessary. Warren D. Oakes has

been manager of the Kansas City branch of the Studebaker Corporation.

Columbus, O.—The Firestone Tire and Rubber Co. has opened a direct factory branch in Columbus, at 197-199 East Gay street.

Detroit, Mich.—The Abbott Motor Car Co. has appointed W. J. Leisaw as district sales manager for the states of Indiana, Michigan and Ohio.

Atlanta, Ga.—The H. W. Johns-Manville Co. announces the appointment of C. S. Berry as manager of the Atlanta office, at 31½ South Broad street.

Davenport, Ia.—The Neuman Machine Co., 308 East Second street, is to have a new two-story garage at Third and Ripley streets. The garage will cost \$10,000.

St. Louis, Mo.—L. H. Mesker, manager of the St. Louis branch of Manning, Maxwell & Moore, Inc., has resigned his position and will be connected in a similar capacity with the Ferro Machine and Foundry Co., Cleveland, O.

Chicago—The Chicago School of Motoring, conducted by F. E. Edwards, chairman of the technical committee of the American Automobile Association, has moved from Michigan avenue to 1619 Wabash avenue, and the name changed to the F. E. Edwards Automobile School and College of Motoring.

Boston, Mass.—E. A. Buck & Co., makers of Powers gasoline, and Best oils, of Worcester, Mass., one of the independent companies, have added two new stations to their chain in Massachusetts by opening branches at Greenfield and Medford,

covering both the eastern and western parts of the Bay state.

Findlay, O.—John Labadie has purchased the George Kersh garage at Ottawa and has leased the building for 5 years.

New York—Fay Morton Henkel, for 4 years the eastern manager of the Remy Electric Co., has joined the forces of the Ward-Leonard Electric Co.

Indianapolis, Ind.—George H. Lloyd, formerly with the Velie Motor Vehicle Co., has joined the sales force of the American Motors Co., of Indianapolis, Ind.

Des Moines, Ia.—The Paige Auto Co. is the name of the latest Des Moines motor company. K. H. Kooker, formerly with the Warren, is the manager of the new concern.

Boston, Mass.—The Metz Co., Waltham, Mass., has decided to open a branch in New York city that will be used as a station for feeding the cars to the middle Atlantic and western states.

Neenah, Wis.—The Bergstrom Motor Car Co. is rebuilding its headquarters into a modern garage at a cost of \$10,000. The company has been occupying a former livery stable building as a garage for some time.

Milwaukee, Wis.—The Michelin Tire Co. of New Jersey is the latest tire company to establish a direct factory branch in Wisconsin. The corporation has filed articles and a statement to do business in Wisconsin, giving its capital stock as \$3,000,000 and the Wisconsin interest at \$25,000.

Recent Agencies Appointed by Motor Car Manufacturers

PLEASURE CARS

| Town | Agent | Car |
|-------------------|---------------------------------|----------------|
| Ashton, S. D. | C. H. Gardner | Detroit |
| Baltimore, Md. | International Mfg. Co. | Metz |
| Baltimore, Md. | Detroit-Baltimore Co. | Abbott-Detroit |
| Boston, Mass. | Nyberg Auto Co. | Nyberg |
| Boston, Mass. | C. B. Johnston Co. | Pullman |
| Boston, Mass. | C. B. Johnston Co. | Ames |
| Britton, S. D. | J. M. Kelly | Detroit |
| Buffalo, N. Y. | Miller & Schulman Motor Car Co. | Moon |
| Brookings, S. D. | S. H. McCarr | Detroit |
| Carpenter, S. D. | W. A. Hicks | Detroit |
| Columbus, O. | Barr Motorcycle Co. | Franklin |
| Cedar Rapids, Ia. | Abbott Motor Co. | Abbott-Detroit |
| Cincinnati, O. | L. C. Denison | Abbott-Detroit |
| Cleveland, O. | Abbott Motor Car Co. | Abbott-Detroit |
| Columbus, O. | Snyder Auto Co. | Abbott-Detroit |
| Charleston, Mo. | Like Howlett | Moon |
| Chilton, Wis. | Hippe Motor Car Co. | Rambler |
| Chilton, Wis. | Hippe Motor Car Co. | Overland |
| Chilton, Wis. | Hippe Motor Car Co. | Buick |
| Des Moines, Ia. | Guarantee Motors Co. | Abbott-Detroit |
| Doland, S. D. | Doland Auto Co. | Detroit |
| Davenport, Ia. | Scott Mercantile Co. | Abbott-Detroit |
| Des Moines, Ia. | Van Vleet Bratt Motor Car Co. | Moon |
| El Paso, Tex. | International Auto Co. | Abbott-Detroit |
| Eureka, S. D. | C. Vorlander | Detroit |
| Erwin, S. D. | W. H. Schenck | Detroit |
| Ft. Wayne, Ind. | Electric Supply & Fixture Co. | Abbott-Detroit |
| Gary, S. D. | Charles Eckhardt | Detroit |
| Goodwin, S. D. | W. Rohwelder & Son | Detroit |
| Groton, S. D. | W. H. Cassels | Detroit |
| Henry, S. D. | R. E. Hubbard | Detroit |
| Huron, S. D. | J. E. Mattice | Detroit |

TRUCKS

| | | |
|--------------------|------------------------|---------|
| Albany, N. Y. | Dominant Motor Car Co. | Stewart |
| Boston, Mass. | C. B. Johnston & Co. | Stewart |
| Chicago | Voltz Brothers | Stewart |
| Indianapolis, Ind. | Archey-Atkins Co. | Mais |
| New York | I. Sekine Co. | Adams |

| Town | Agent | Car |
|---------------------|----------------------------------|-----------------|
| Hayti, S. D. | Carl J. Erickson | Detroit |
| Huntington, W. Va. | Abbott-Detroit Motor Co. | Abbott-Detroit |
| Holyrood, Kans. | G. L. Baker | Moon |
| Kansas City, Mo. | MacDowell Motor Car Co. | Moon |
| Minneapolis, Minn. | MacArthur, Zollars, Thompson Co. | Marathon |
| Minneapolis, Minn. | Minnesota Motor Car Co. | Henderson |
| Milwaukee, Wis. | E. B. Leverenz | Pullman |
| Mediapolis, Ia. | Fleener's Garage | Moon |
| Mystic, Conn. | Mistic Auto Station | Franklin |
| Marletta, O. | Jacob Spindler | Abbott-Detroit |
| New Orleans, La. | A. N. Kinch | Moon |
| Norfolk, Va. | Roethke Brothers | Abbott-Detroit |
| Oldham, S. D. | C. B. Jensen | Detroit |
| Omaha, Neb. | Traynor Automobile Co. | Abbott-Detroit |
| Pierpont, S. D. | W. L. Almquist | Detroit |
| Peever, S. D. | Victor Nelson | Detroit |
| Piqua, O. | Meinders Garage | Franklin |
| Punxsutawney, Pa. | G. Frank Porter | Moon |
| Sisseton, S. D. | J. J. McCoy | Detroit |
| St. Lawrence, S. D. | Carl Brothers | Detroit |
| St. Louis, Mo. | Warren Motor Car Co. | Argo |
| Sterling, Ill. | Greenough & Pittman Co. | Abbott-Detroit |
| Sioux City, Ia. | John J. Keefe | Abbott-Detroit |
| Spokane, Wash. | Spokane Auto Truck Co. | Franklin |
| Troy, O. | Troy Auto Co. | Franklin |
| Washington, D. C. | David S. Hendrick | Abbott-Detroit |
| Wilson, N. C. | Wilson Motor Co. | Abbott-Detroit |
| Washington, Pa. | Washington Automobile Co. | Moon |
| Washington, D. C. | Barnard Motor Car Co. | Reo |
| Washington, D. C. | Barnard Motor Car Co. | Stoddard-Dayton |
| Yankton, S. D. | F. J. Nyberg | Moon |

| | | |
|---------------------|---------------------------|---------|
| Pittsburgh, Pa. | Alco Pittsburgh Sales Co. | Stewart |
| Providence, R. I. | Portland Garage | Stewart |
| San Francisco, Cal. | S. G. Chapman | Stewart |
| Washington, D. C. | Davis D. Hendrick | Stewart |



The Motorist's Kindergarten



EDITOR'S NOTE—Motor Age is publishing in this department a series of non-technical explanations of the various parts of motor cars for the benefit of the reader who knows nothing about them. The subjects will be dealt with in the most elementary manner, so that the series when completed will form a simple elucidation of the car. The first article appeared October 10, 1912.

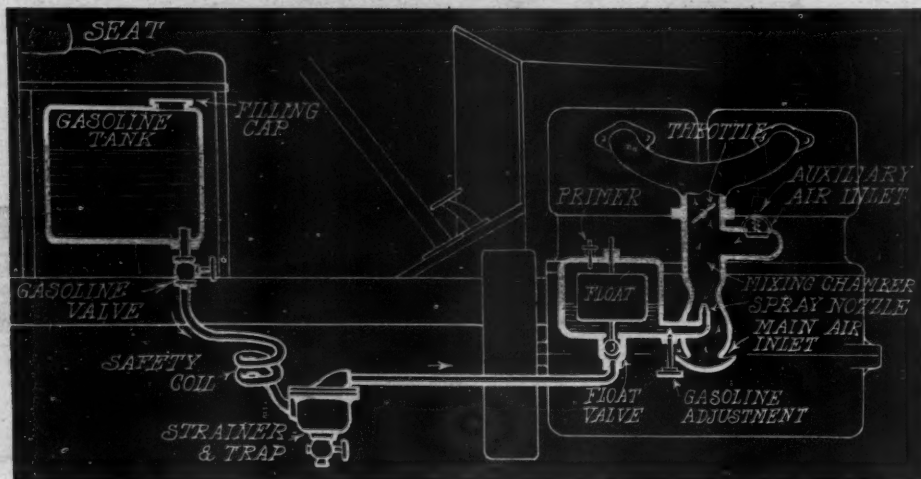


FIG. 16—COURSE OF THE GASOLINE FROM TANK TO MOTOR IN GRAVITY FEED SYSTEM

THERE are two ways of supplying the gasoline to the carburetor, one known as the gravity system and the other as the pressure system. The gravity system is much the simpler and more common method of fuel feed. In this system the fuel tank is simply carried at a level high enough that the carburetor is below it, so that the gasoline runs down the pipe from the tank to the carburetor by gravity as water runs down hill.

In the other system the tank may be located at a lower level than the carburetor and the gasoline forced up into it by air pressure in the tank. This pressure sometimes is supplied by a small pump operated by the engine, but more often the exhaust pressure in the exhaust pipe is used. The tank of course must be air-tight and a small pipe runs from the tank to the exhaust pipe. A small check valve permits the pressure in the exhaust pipe to be communicated to the tank, but prevents the pressure in the tank from leaking back into the exhaust pipe. A relief valve in the tank or in the pipeline prevents the pressure from getting too high. In addition to this, there is necessary a hand-pump so that enough pressure can be put into the fuel tank by hand to get gasoline into the carburetor for starting, after which the exhaust pressure takes care of it. The advantage of the pressure system is that the tank can be hung low and steep hills do not prevent fuel reaching the carburetor, as may be the case with the gravity feed.

In the pipeline from the tank to the carburetor in either system of fuel feed there are three things needed. One is a shut-off cock by which the pipe can be closed in

Fuel Feed and Mufflers

case it is necessary to remove the carburetor or the car is to stand idle for some

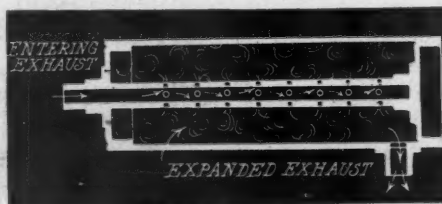


FIG. 17—HOW A MUFFLER SILENCES EXHAUST

time. The other is a trap to prevent impurities in the gasoline tank from entering the carburetor. The impurities are either dirt or water. Dirt will stop up the fine

opening in the spray nozzle if it gets to the carburetor and water mixed in the gasoline makes the motor miss.

To prevent dirt entering the carburetor the gasoline is forced to pass through a fine screen in the trap on its way from the tank. To take the water out of the fuel, the trap is provided with a well or basin lower than the feed pipe; and the water, being heavier than gasoline settles in this basin, the gasoline passing over it to the carburetor.

Another detail of the gasoline line that is not always present, but should never be omitted, is the safety coil illustrated in Fig. 16. This is simply a coil in the pipe line which prevents backfires in the carburetor from affecting the fuel in the tank. In general it is pretty safe to rely on this coil to prevent any flame in the pipe line ahead of it from reaching the body of the fuel.

The difference in noise made by a motor with the muffler cut out and with the muffler in action is familiar to all, and it is unnecessary to explain that the purpose of the muffler is for reducing the noise of the exhaust gases. Fig. 17, however, illustrates how the muffler accomplishes this purpose. The one illustrated is only one of many types, but is perhaps the simplest. It will be seen that the exhaust pipe is extended into a barrel of sheet metal and the pipe is pierced with holes so that the exhaust gas is let out gradually into the drum from the pipe. This causes the gas to expand slowly. A further slow expansion occurs when the gas emerges from the drum into the open air through the outlet shown at the bottom.

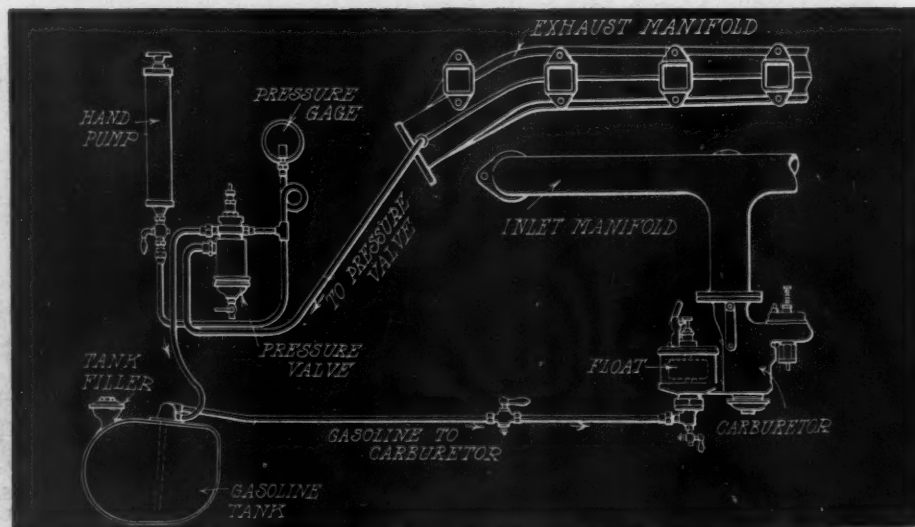


FIG. 18—PIPING AND CONNECTIONS OF A PRESSURE FUEL-FEED SYSTEM